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The localization of function: a developmental study of the localization of emotion and the self.

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THE LOCALIZATION OF FUNCTION: A DEVELOPMENTAL STUDY OF THE LOCALIZATION OF EMOTION AND THE SELF

A Thesis Presented

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ABSTRACT

The present thesis was concerned with developmental trends in the bodily localization of two kinds of psychological functions, namely, the emotions and the self. The purpose was to illustrate the symbolic qualities of the localization of these functions. Eight males and eight females in each of grades 1, 4, 7, 10 and college were asked to report on the physical experience of four emotions (anger, happiness, love and sadness), two nonemotional states (hunger and thinking), and the self. Subjects were also asked to designate in which area of the body each function was most strongly experienced.

The thesis is divided into two parts. The first of these deals with the localization of emotions, and also hunger and thinking; the second part deals with the localization of the self. With regard to Part I, it was expected that hunger would be localized within the body (torso) and thinking in the head by all subjects and that the localization of the four emotions would increasingly center on the body rather than the head as one progressed up the developmental sequence. The predictions were based

on theoretical considerations concerning the social role of emotional experience and its relationship to conscious processes.

The expectations for the localization of hunger and thinking were largely confirmed. The data obtained on the localization of the four emotions were complex and differed depending upon the emotion. As expected, the localization of anger in the head decreased with age while the localization of anger in the body increased. Love, however, tended to be localized in the body at all ages although this localization decreased somewhat after the first grade. Sadness was found to be localized in the body and head by subjects in all age groups; in the youngest subjects, sadness was also frequently localized in the face. Happiness was diffusely localized throughout the body by subjects in all age groups. These data were interpreted as being consistent with the notion that the bodily localization of emotion symbolically reflects the role of emotion in the matrix of social behaviors.

The second part of the thesis focuses on the localization of the self and its relationship to the localization of emotion. Each of the 80 subjects described above was asked three different questions concerning the localization of the self. It was expected that with increasing age the self would become colocalized in the head with thinking,

and that the loci of localization of the self and emotion would diverge with age. As expected, the localization of the self in the body decreased with age whereas the localization of the self in the head increased. The divergence of the localization of self and emotion could not be examined. It was found, however, that the self was more often colocalized with thinking and the positive emotions than with the negative emotions. These data are discussed in terms of their implications for the social construction of emotion and the self.

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C H A P T E R I

GENERAL INTRODUCTION

Overview

This thesis is concerned with developmental trends in the localization of various psychological functions. The theme that will be presented in the introductory section of this paper is that the localization of function in a particular body part is often symbolic in that it reflects the way in which that function is conceived. Following the introduction will be a description and discussion of developmental research on two specific problems in the localization of function. These problems were studied in the context of a single cross-sectional developmental study. For the sake of clarity of presentation, the background literature and experimental findings on the localization of emotion are first presented and are followed by a discussion and description of the research on localization of the self. In the final section, the implications of this developmental work for general issues in the localization of function will be discussed.

The Localization of Function

The first question to be addressed in considering the localization of function is simply - what does it mean to localize a function? Luria (1973) specifically addresses this issue and points out that the term "function" has both narrow and broad definition:

> Those investigators who have examined the problem of the cortical 'localization' of elementary functions...have understood the term 'function' to mean the function of a particular tissue. Such an interpretation is unquestionably logical. It is perfectly natural to consider that the secretion of insulin is a function of the pancreas. (p.27)

Luria continues by pointing out that the term function is often used to denote more complex activities than the behavior of a particular tissue and that the localization of complex functions becomes problematic.

> When we speak of the 'function of digestion' or 'function of respiration' it is abundantly clear that this cannot be understood as a function of a particular tissue...The ultimate object of respiration is the supplying of oxygen to the alveoli of the lungs and its diffusion through the walls of the alveoli into the lungs. However, for this ultimate purpose to be achieved, a complex muscular apparatus incorporating the diaphragm and the intercostal muscles, capable of expanding and contracting the chest and controlled by a complex system of nervous structures in the brain stem and higher centres, is necessary. It is obvious that the whole of this process is carried out, not as a simple 'function' but as a complete functional system, embodying many components belonging to different levels of the secretary, motor and nervous apparatus. (p.27)

Each "complete functional system" is characterized by its goal or task. However, although the task is invariant, the process by which it is accomplished may vary and involve different components of the functional system, with each component performing its own narrow function.

One may conclude from Luria's analysis that questions about the strict localization of function may be answered meaningfully only when the function in question is narrow and highly specified. Yet, as the examples presented below will illustrate, a variety of highly complex psychological processes also become attached to different anatomical structures. It is suggested here that localization of these complex functions also occurs, but not in the same sense as elementary physiological functions. Rather, it is hypothesized that localization of complex psychological processes reflects the ways in which they are conceptualized rather than the activities of particular body tissues. Insofar as various parts of the body become carriers of meanings which extend beyond their actual physiological functions these body parts may be said to have acquired symbolic significance.

In order to clarify the role of symbolism in the localization of function three related issues involved in the attribution of complex functions to different parts of the body will be briefly discussed. Primarily cross-

cultural and historical examples will be cited in illustrating these, since it is often easier to recognize the symbolic qualities of a behavior when it is outside one's own cultural framework.

1) It is sometimes the case that functions may become attached to bodily structures on the basis of social or metaphysical beliefs about the nature of that function. Descartes' naming of the pineal gland as the point of interaction between the body and soul clearly illustrates this (Boring, 1929). His reasoning may be summarized as follows: Volition and perception are functions of the soul. The soul itself is unitary and unextended in space. Within the body, the brain is the organ to which sensation proceeds and motion originates. The interaction of body and soul must take place in a part of the brain which would not violate the unitary nature of the soul. That part of the brain must be the pineal gland, the only unduplicated part. The choice of the pineal gland, then, was made partly on symbolic grounds insofar as it was based on Descartes' conception of the characteristics and functions of the soul rather than functions actually observed to be intrinsic to that organ.

Averill (1974) suggests that the scientific emphasis on the role of the body, and especially in involuntary and phylogenetically primitive structures in the study of

emotion reflects the same kind of symbolic reasoning. More specifically, he argues that for social reasons emotional behavior is devalued and that the tendency to localize emotion in the "old" or "visceral" brain is symbolic of this devaluation and contributes little to a scientific understanding of the mechanisms which mediate emotional behavior. He has termed the process by which psychological functions become linked to physiological structures on the basis of scientifically extrinsic symbolic relationships "psychophysiological symbolism".

2) The significant impact of socially derived constructions on the localization of emotion is further illustrated in the consideration of cross-cultural differences in psychophysiological symbolism. This corpus of data indicates that the same body parts have dramatically different functional significance in different cultural groups. For example, while thinking and intelligence have been thought to reside in the lungs by some cultures, the ears, heart and brain are regarded as the seat of intelligence in other cultures. Some cultures associate courage with the hair while various others understood it to be located in the limbs, brain, heart and liver. Similarly strength is thought to reside in the heart in some societies while the brain and the testicles are associated with this function in other cultures (Frazer, 1935).

Within each particular culture, elaborate rationales may evolve for the localization of various similar psychological functions. For example, in his study of the Trobriand Islanders, Malinowski (1953) noticed some intriguing differences in the localization of intelligence versus memory:

> The mind, nanola, by which intelligence, power of discrimination, capacity for learning magical formulae, and all forms of non-manual skill are described, as well as moral qualities, resides somewhere in the larynx... The memory, however, the store of formulae and traditions learned by heart, resides deeper in the belly. A man will be said to have a good nanola, when he can acquire many formulae, but though they enter through the larynx, naturally, as he learns them, repeating word for word, he has to stow them away in a bigger and more commodious receptacle; they sink down right to the bottom of his abdomen. (pp. 408-409).

The diverse cultural localization of the same quality suggest that the process involved in singling out a specific body part does not involve simple observation but complex processes of historical, social and religious legitimation whereby simple observations or deductions may attain the status of shared knowledge (See Berger and Luckman, 1967). The consensual localization of a psychological concept in a single body part then becomes dependent

upon a system of social beliefs and the body part comes to have meaning in terms of its social, in addition to its biological, significance.[1]

3) The last point that will be made here about the localization of function is that, implied in the attribution of different functions to different body parts, is the notion that these functions are distinct from each other. The localization of bravery in the liver and strength in the testicles (Frazer, 1935), for example, implies that strength and bravery are conceived to be somewhat independent of one another. This can be further illustrated by contrasting Plato's localization of thinking (which also illustrates the role of metaphysical beliefs mentioned in (1) above) with that of the earlier Homeric Greeks. Plato (in Timaeus) quite clearly distinguished between rationality, emotion (passion) and appetite, and he also made their localization clearly distinct. Reason, "by nature highest and best", was placed in the head which "copied the shape of the universe" (the sphere). Feelings, by nature "terrible and necessary", were divided into two kinds: appetites and spirited emotions. The latter (courage, anger, and ambition)

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[1] Douglas (1970) provides an extended discussion of the relationship between social and cultural matrices and concepts of body.

were placed in the chest where they could be controlled by the head and combine with the head in controlling the appetities. The appetities for "food and drink and other natural needs of the body" were located in the stomach, "as far as possible from the seat of deliberation, leaving the highest part of us to deliberate quietly about the welfare of each and all".

The Homeric Greeks, in contrast to Plato's elaborate differentiation of functions, had no such clear distinction between the intellect and emotion. Onians (1951) writes:

> To a verb (oida) which later was reserved for the expression of cognition, intellectual awareness, we are compelled to give a richer meaning, a relation to feeling, emotion and even to conation. (pp. 15-16)

Emotion and intellect were considered as one and resided in the lungs, an organ whose qualities (dry or wet) and action (the breath) changed as thought and feelings changed.

It appears, then, that the localization of complex psychological function cannot be understood simply by examining structure-function relationships. It is not the structure per se, but the socially derived symbolism concerning the structure in relation to the functions which determines the pattern of functional localization.

The Ontogeny of Functional Localization

There is some evidence to suggest that in our own culture children's early learning about the interior of their bodies reflects some of the same processes involved in the localization of function. Schilder and Wechsler (1935) asked a group of children (4-13 years) to report on the content of their bodies. The younger children mentioned only the observables - food recently eaten. As children began to differentiate the internal organs of their bodies, however, they often did so on the basis of symbolically imbued localizations such as those mentioned above. Nagy (1453), for example, found that five year old children tend to impute intellectual functions to the brain, but emotional functions to nerves, which were particularly associated with the experience of tension. Gellert (1962) found that when children were specifically questioned about the functions of the heart, many of the younger children (4-7 years) gave functions that were related to emotional processes and needs, or to the conscience (e.g., "makes you do the things you should"). By the age of eleven, the functions of the heart were described in more physiological terms (e.g., "it pumps blood to different parts of the body"). Schilder and Wechsler (1935) and Gellert (1962) report that the

modal age for giving "correct" (i.e., normatively adult) responses for most organs was 9 to 11 years.

Analytic writers such as Thass-Thienemann (1963; see also Kubie 1951) have pointed out that even once a degree of physiological knowledge of body parts is obtained, it does not replace the metaphoric and symbolic meaning of these parts but appears to coexist with them. The heart, for example, may well be understood to be both a pump which circulates blood and a receptable for tender emotions. The significance of the part of the body varies with the meanings of different situational contexts.

The present thesis focuses on the localization of two sets of functions, the emotions and the self. In the next chapters, the nature of these functions will be elucidated, followed by a description and discussion of age-related changes in their localization. Based on the foregoing discussion it is expected that the localization of these psychological concepts would be largely symbolic in nature.

PART I

C H A P T E R I I

THE LOCALIZATION OF EMOTION:INTRODUCTION

As has been mentioned previously, Averill (1974, 1976) attributes the scientific emphasis on the biological roots of emotion less to any special properties of emotional (as opposed to, for instance, cognitive) experience than to the intrusion of more general conceptions of emotion. He has suggested an alternative framework which both explicates the emphasis on physiological substrates in theoretical conceptions of emotion and provides a skeletal structure for a systematic approach to the study of emotion. He suggests a model of emotional functioning based on a constructionist framework derived from the sociology of knowledge. It rests on the premise that emotional behaviors are social in nature and, like other social behaviors, are learned and have meaning within the sociocultural context in which they develop. Each emotional reaction, in order to be considered appropriate, or nonpathological, presupposes on some level of knowledge of the context to which it is appropriate, of the rules governing its expression and of the anticipated outcome of its expression. In short, each appropriate emotional reaction is dependent upon knowledge

of the rules governing social behavior.

Averill notes, however, that emotional behavior is accorded a dual, and somewhat paradoxical status in the social system. On the one hand, the rules and norms governing emotional behavior exist because emotional behavior does have a social function. Anger, for example, may be an effective prophylactic against the violation of normatively established customs such as personal space or social obligation. On the other hand, emotional behavior is somewhat deemphasized because it tends to be intuitive and impulsive and thus violates the (at least Western) ideal of rationality (meaning a deliberate, well-reasoned weighing of evidence). He argues that most standard emotional reactions are socially constituted in such a way as to reflect both their value in regulating social behavior and the discouragement of impulsive acts in general. As a result of this, as an individual learns the rules governing emotional behavior he or she also learns to interpret this behavior as not being under conscious control. Subjective, emotions then come to be experienced as "seizing", "gripping" or "overcoming" the self and as emanating from parts of the body which are distinct from the self. Scientifically, this subjective experience becomes translated and reified in the emphasis on the

instinctive roots of emotion, the predominance of animal research in the study of emotion and the search for emotion-mediating mechanisms in sub-cortical structures of the brain.

The gist of the above argument is that emotions are socialized and that part of the process of acquiring socially-shared knowledge of emotional concepts is in learning that emotions are experienced as non-cognitive and involuntary. To paraphrase Vgotsky (1962), it may be said that the true direction of the development of emotion is not from the individual to the socialized, but from the social to the individual.

Language and the Socialization of Emotion

While there are undoubtedly many socializing forces that are non-linguistic in nature, language, as the symbol-system and conveyor of culture par-excellence undoubtedly plays a major role in the socialization of emotion.

Luria (1961) stresses that the very act of labelling an object conveys meaning not only about the specific object in question but about its meaning in relationship to the rest of the immediate universe.

> When a mother shows a child something and says "cup", first her pointing and then the name of the object cause an essential modification in the child's perception...

> In isolating the object from its environment, the action of pointing reinforces the stimulus, making it a figure set in a ground. The word designating the object delineates its essential functional properties and sets it within the category of other objects with similar properties; it serves a complex task of analysis and synthesis for the child.. (p. 19)

Later on, the child becomes adept at mastering categorical concepts and creates his world by using language on his own.

While both Luria and Vgotsky concern themselves primarily with the social development of higher mental processes such as active attention and deliberate action, it is not difficult to conceptualize an extension of their approach to the development of emotional concepts. Parents' repeated acts of labelling a child's emotional state isolates it from other states by unifying disparate components under one name and verifies its context and expression as being proper and appropriate. Anger, for example, may be appropriately experienced in a variety of contexts and may, in different instances, involve a variety of thoughts, bodily feelings, behavioral tendencies and expectations for outcome. The repeated labelling of that state facillitates the formation of a concept of the emotion and allows for the abstraction of more general rules governing that state.

Yet, the process of acquiring emotional concepts involves more than the isolation and labelling of a state. There is a dialectical relationship between the language of emotion and its experience. Numerous linguistic phrases such as "animallike rage", "gut reaction", "broken-hearted" and "butterflies in the stomach" both reflect the notion that emotions do not require human cognitive capabilities and, as the everchaning manifestations of hysteria illustrate (c.f. Smith-Rosenberg, 1972), magnify the possibility of their being experienced as such. Thus, as the child acquires language, he comes to participate in the creation of his own emotional states.

Ontogenetic Shifts in Emotional Concepts

If there is a dialectical relationship between emotional concepts and the experience of emotions, then one would expect that the latter would change with age as the child becomes more sophisticated in the use of emotional concepts. Unfortunately, there has been no systematic study of the child's changing concept of emotion analogous to Piaget's (1952) developmental work on the child's conception of number. However, a number of pertinent data do exist. There have been several studies on the development of the child's ability to

recognize the expression of various emotions. For example, Gates (1923) and Izard (1971) have examined developmental changes in the ability of children to link descriptions of emotional states to various facial expressions. In a similar vein, Dimitrovsky (1964) studies the development of children's ability to recognize emotion (happiness, sadness, anger, love) by the tone of voice of the speaker. The general findings of these studies are as would be expected. As children mature, they become more proficient at recognizing various emotional expressions. The important point is that Izard (1971) and Dimitrovsky (1964) both found that children as young as 2 1/2 to 5 were fairly competent at making emotional judgments. These data are important for they suggest that children as young as 5 are capable of understanding, perceiving and communicating information about emotional experience.

Another way in which the development of emotion has been studied is by examining children's responses to emotion-laden stories. In a series of studies of this kind, Borke (1971,1973) found that children as young as three could discriminate happy stories from frightening, sad and anger-provoking stories. By six years of age, children were able to discriminate sad stories from frightening stories. Gilden (1968) read to children descriptions of the internal experience of various emotional states and

examined the development of children's applications of adult-like labels to those states. She found that "consensual labels for happiness and anger apparently come to use prior to the ages included in this study (second to tenth grade) while consensual labels for contentment and depression apparently come into use in ages subsequent to those included in this study" (p. 86). Consensual labels for anxiety, confidence, guilt and love all showed developmental trends within the age range she studied. It appears, then, that the recognition and labelling of emotional content and expression may involve a learning process which begins well before the age of six and continues at least into adolescence.

Developmental Changes in the Experience of Emotion

The studies on labelling and recognition do not show that children's conceptions and experience of emotion change, but only that their facility in using emotional terms changes with age. The issue of changing concepts of emotion has been approached in several studies. Falkowski (1975) studied changes in the concept of love over the life span and found that there is "greater differentiation and elaboration of the concept of love with age" (p.). For instance, the importance of reciprocity and committment found in the adult conception of love does

not appear until adolescence. Farmer (1967) looked at changes in children's descriptions of emotional states (happy, sad, loving, angry, scared) from the second to the eighth grade. His major findings were that as children matured they increasingly tended to describe their emotional experience in terms of changes in their general (i.e., perceptual, cognitive and physical) functioning and changes in their interpersonal behavior. In a series of studies (Wolman, Lewis and King, 1971; 1972a; 1972b; Lewis, Wolman and King, 1971; 1972a; 1972b) changes in children's reported experience of a variety of emotional states (hunger, thirsty, sleepy, happy, angry, sad, scared, nervous) from ages 5 to 13 were examined. Wolman et al (1971) found, for instance, that older children tended to ascribe the initiation of an emotion to their own behavior, thoughts or feelings (e.g., "I get mad when I fall down and hurt myself") where as younger children tended to ascribe it to situations outside themselves (e.g., "I get mad when my brother wrecks my toys"). When children were asked what they want to do when they experience various emotions, it was found that as children got older they wished to prolong happiness, actively cope with anger and escape from feelings of sadness (Lewis et al, 1972a). It appears, then, that, there is some evidence supporting the view that the actual experience of emotion changes with age.

Developmental Changes in the Localization of Emotions

One study was specifically designed to examine age related changes in the localization of emotion. Wolman, Lewis and King (1972b) asked a group of 5 to 13 year old children where in their bodies they felt hunger, sleepiness, happiness, sadness, anger, fear and nervousness. Unfortunately, the only emotion for which the results were reported in detail was anger. They found that the frequency of head-brain responses increased with age, while the frequency of stomach responses decreased with age. This pattern of results was significant only for females. Wolman et al interpreted this in the following way:

> It is as if once the physical expression of anger becomes socially unacceptable the anger moves out of the body, becomes "desomatized" and resides as ideas or sensations in the head, brain, or as some children stated, "in my mind". (p. 78).

It should be noted that both the result and its interpretation are contrary to the viewpoint expressed earlier namely, that the role of the body, as opposed to the head, becomes emphasized as children learn to dissociate emotional behavior from the self. However, the data from Wolman et al study must be interpreted with caution. The age range employed was unfortunately truncated with

a spread of only eight years between their youngest (5 years) and oldest (13 years) subjects. It is conceivable that this constructed range obscured trends that might emerge if a longer developmental span was considered. The data from the present thesis suggest that the examination of a broader age range does indeed reveal trends which would otherwise remain obscured with more limited sampling.

Summary and Hypotheses

The present study was designed to further examine age-related changes in the localization of various commonly studied emotions (anger, love, happiness and sadness) and functions (hunger and thinking) by interviewing subjects in grades 1 through college. If Averill's (1974) contention that the emphasis on the role of the body is significant in a symbolic rather than scientific sense, then it would be expected that as children begin to acquire adult-like concepts of emotion, they would tend to associate their emotional experiences with changes in their bodily state. The following, then, is hypothesized to occur:

1) Thinking will be localized in the head and hunger in the stomach at all ages included in this study.
2) With increasing age, more emotions will be localized.
3) With increasing age, emotions will be localized in the body rather than the head.

CHAPTER III

METHODS

Subjects. A total of 80 subjects, consisting of 8 males and 8 females in each of grades 1, 4, 7, 10 and college, participated in the study. The grade school sample was drawn from the elementary, junior and senior high schools of a predominantly white, middle class, suburban area and was comprised primarily of children whose parents were either at middle management level or on the faculty of a private college in that area. An individual child was selected to be a subject only if school personnel reported that the child presented no special emotional or academic problems and after parents' consent was obtained. The college-age sample was drawn from introductory psychology courses at the University of Massachusetts. College students were offered course credit for their participation.

Procedures. The procedure took the form of an interview comprised of a standard series of open-ended questions.[2] The same set of questions was asked about the emotions of anger, happiness, love and sadness, the process of thinking and the state of hunger. (A set of three

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[2] Yarrow (1960 points out that the interview is a particularly suitable technique for gathering information about the subjective experience of children as young as four.

different questions was asked about the experience of the self, as is reported in Chapter VII of this thesis).

The specific emotions listed above were chosen for several reasons. In the first place, there would be little disagreement that these are typically considered to be "standard" emotions. Secondly, it has been shown (Farmer, 1967, Dimotrovsky, 1964, Gilden, 1968) that children in the second grade can respond meaningfully to these terms. Thirdly, the selection of these four emotions gives a balanced distribution of positive and negative emotions. The state of hunger and process of thinking were chosen because they provided comparison states for the emotions. It was expected that these would be localized by all subjects and would provide a means of insuring that subjects understood the localization question.

Each interview was administered individually in the subjects school, and all responses were tape recorded. In order to establish rapport, subjects were provided with s general introduction to the interview and assured that the study was in no way connected with their school work. Since the study was particularly concerned with bodily references in descriptions of emotional experience, a short preliminary test was given to insure that the youngest subjects had at least some awareness of different anatomical

concepts. At the start of the session all subjects were asked to point to their feet, ankles, knees, stomach, chest, back, hands, wrists, elbows, neck, head and face. All of the children were able to do this without hesitation.

After these preliminaries, each subject was asked a series of questions regarding the localization of the self and emotion. With regard to the latter, 5 questions were asked:

1. Have you ever felt _____ (angry, sad, happy, love)?
2. Can you give me an example of a time when you felt _____, or tell me what kinds of things make you feel that way?
3. What's it like to feel _____?
4. What does your body feel like when you feel _____?
5. Where in your body do you feel it most when you feel _____? How does it feel?

Questions 3 to 5 were also asked with regard to hunger and thinking.

Although the focus of this study was on the localization of the various states (question 5), questions 1 to 4 were included for two reasons. First, they provided a means of determining whether the child understood the concept that was under consideration. Second, they served as aids for the subjects in the recall of the experience of various states.

The emotion and control (hunger and thinking) questions were counterbalanced across subjects. Half the subjects received the questions in the following order: positive emotion (either happiness or love), negative emotion (either sadness or anger), control (either anger or thinking), the other positive emotion, the other negative emotion, the other control state. The remaining half of the subjects received the questions in this order: negative emotion, positive emotion, control, negative, positive, control. Within each of these two groups, half the subjects received questions about the self prior to the first emotion question while the remaining half received the self questions following the final set of control questions.

Scoring the Data

The interviews were coded using a list of body parts which was comprised of all organs, systems and parts of the body mentioned by the subjects. This list may be found in Appendix A.

To count as a "localization" it was only required that the body part be mentioned in connection with the function in response to any of the five questions. There were 78 instances out of a possible 480 localizations

(80 subjects times 6 functions) in which subjects localized a function in more than one body part. In these cases, subjects were asked to designate which body part was most important and this localization was used in all subsequent analyses.

The localization of each function for each subject was scored independently by two raters. Out of 596 responses involving specific parts of the body, there were 46 disagreements, yielding a 92.3% rate of reliability. All differences were resolved through discussion.

After the initial scoring, the responses were grouped into five major body areas:

I. Non-localization: This category includes all non-classifiable responses such as "I don't know", "nowhere" and "everywhere".

II. Head: This category includes references to areas within and on the surface of the head, excluding the face. Included in this category are head, mind (only if it was then localized in the head by the subjects), inside head, brain, top of head, temples, back of head.

III. Face: Included here are all references to the face such as face, mouth, teeth, eyes, cheeks, jaw. Placement of the forehead in either the "head" or "face" categories was determined by the context in the interview. If reference was made to the internal sensation in the forehead, it was placed in the "head" category. If no such reference was made it was classified as "face".

IV. Body: Included in this category were neck, throat, torso, shoulders, chest, heart, midriff, abdomen, navel and gut.

V. Limbs: Included here were arms, hands, fingers, fists, forearms, biceps, legs, calves, knees and feet.

This more general grouping was made because the wide variety of responses and consequent small frequency of response in each specific category often made meaningful comparisons impossible. All data were therefore analyzed using the major body areas. Specific body organs were considered only when at least five subjects mentioned the same organ as being associated with the same function.

C H A P T E R I V

RESULTS

This chapter examines developmental trends in the localization emotion. The results are presented as follows: In the first section the focus is on establishing the validity of the procedures. Specifically, do children as young as six understand what it means to localize an emotion in a particular anatomical structure? The second section deals with the use of the different body areas in the localization of function. The third section is specifically concerned with developmental trends in the localization of each function. The complete data for each subject may be found in Appendix B.

At the outset it should be mentioned that no significant differences between males and females were found in the use of the major body areas nor were interactions found between sex and grade, or between sex and emotion. Therefore, the data for males and females were combined in the following analyses.

The Validity of the Localization Measure

Before examining age-related changes in the localization of various specific functions it was necessary to ascertain whether the younger subjects, especially those

in the first grade, were able to understand and respond meaningfully to questions on the localization of function. The criteria for validity were the following: 1) Did all subjects have a basic comprehension of emotional concepts? 2) Did the subjects understand the localization question? and 3) Were the subjects sufficiently familiar with anatomical concepts to provide a variety of responses if necessary?

Comprehension of emotional concepts. Basic comprehension of the various emotional concepts was examined by asking subjects to provide an example of a situation which would elicit each emotion. Subjects in all grades were able to provide an example of a situation which would be appropriate to the emotion under consideration.

Comprehension of the localization question. A check on subjects' comprehension of the localization question (Where in your body do you feel it most when you feel _____?) was made by examining the responses to questions on hunger and thinking. All subjects in this study localized hunger and all but two subjects (a first grade male and a tenth grade male) localized thinking. (The specific nature of these localizations will be reported upon more fully in later sections.) It appears, then, that children as young as six years are able to conceptualize functions as being localized within the body.

Use of anatomical concepts. Age-related differences in subjects' ability to name different parts of the body were examined by comparing the use of the major body areas, as well as the most frequently mentioned specific body organs, among the different grades. As will be described below, few developmental changes were observed in these analyses. This fact indicates that there is consistency in usage of words referring to the body; and it also suggests that even among the youngest subjects, the instructions provided were correctly interpreted.

Presented in Table I are the frequencies with which subjects in the different grades mentioned body parts in each of the major body areas. As can be seen in this table, the number of non-localized responses decreased with age ($\chi^2 = 13.13, df=4, p < .02$). The largest differences occurred between the two younger (grades 1 and 4) and three older grades. Subjects in the first and fourth grades gave a total of 39 non-localized responses whereas subjects in the seventh, tenth and college groups gave a total of 25 such responses ($\chi^2 = 13.50, df=1, p < .001$).

The fact that the younger subjects gave fewer localized responses meant that their frequencies of response in each of the other categories would necessarily be lower. Since it was not clear whether the non-localized

TABLE I

GRADE DIFFERENCES IN THE USE OF MAJOR BODY AREAS

Grade	Non-localized	Head	Face	Body	Limbs
1	20	29 (38%)	9 (12%)	33 (43%)	5 (7%)
4	19	32 (42%)	12 (16%)	27 (35%)	6 (8%)
7	5	33 (36%)	7 (8%)	42 (46%)	9 (10%)
10	4	25 (29%)	13 (15%)	35 (41%)	12 (14%)
College	9	25 (29%)	17 (20%)	37 (43%)	8 (9%)

Numbers refer to frequency of response. Percentages refer to percent of total number of localized responses within each grade.

responses indicated a "true" non-localization of function or an inarticulateness on the part of the younger subjects, it was decided that the use of the different body areas between grades would be examined by comparing the proportion of localized responses in each grade. In all subsequent analyses, except those concerning non-localized responses, proportions were used for comparisons between grades whereas frequencies were used for comparisons between body areas or function (i.e. in cases where all grades are combined). Non-localized responses were always compared using frequency of response. The adoption of this procedure had an additional advantage in that it rendered the treatment of data in this study analogous to that used by Wolman et al (1972b).

In general, few differences in the proportion of responses in different parts of the body were found. The trend towards decreased naming of the head with age which can be observed in Table I proved to be nonsignificant. No differences were found in the proportions of face, body and limb responses among the different grades.

As an additional means of establishing a basis for comparison of localization responses among the different age groups, the frequencies and proportions of the four most frequently mentioned specific body organs (i.e., brain, eyes, heart and stomach) were examined. These data may be

found in Table II. No differences among grades were found in the proportion of subjects mentioning the eyes, heart or stomach. It was found, however, that the proportion of subjects specifically naming the brain decreased with age (χ^2 =32.16,df=4, $p < .001$). This was also found when the tendency to name the brain was compared only to the total number of head responses in each grade (χ^2 =29.05,df=4, $p < .001$). It appears, then, that younger subjects were more likely to name the brain specifically than older subjects. It should be noted, however, that the proportion of head responses remained constant throughout the age range studied. Whereas the subjects in the younger grades tended to name the brain as a whole, older subjects tended to describe specific locations in or on the head that often implied parts of the brain (e.g., "in the back", "on top", "behind my forehead").

As a whole, these results indicate that the younger subjects in this study had sufficient familiarity with different anatomical concepts to respond meaningfully to the localization questions. While there were fewer localized responses given by the younger subjects, those that were given were varied between different parts of the body. The results therefore suggest that the use of a proportion measure (i.e., % of localized responses in each grade)

TABLE II

AGE DIFEERENCES IN THE USE OF THE FOUR MOST FREQUENTLY MENTIONED BODY ORGANS - COMBINING FUNCTIONS

	GRADE				
	1 (n=76)	4 (n=77)	7 (n=91)	10 (n=85)	College (n=87)
Brain	15 (20%)	18 (23%)	8 (9%)	2 (2%)	2 (2%)
Eyes	3 (4%)	1 (1%)	1 (1%)	3 (4%)	6 (7%)
Heart	12 (16%)	9 (12%)	13 (14%)	9 (11%)	9 (10%)
Stomach	19 (25%)	16 (21%)	24 (26%)	21 (25%)	18 (21%)

Numbers refer to frequency of response. Percentages refer to percent of total number of localized responses within each grade.

makes it unlikely that developmental differences in the localization of function may be simply attributable to increased verbal ability in the older subjects.

The Significance of Different Body Parts

This section focuses on trends in the assignment of function to different parts of the body. The general question here is - Which functions are particularly associated with each body area?

The data on the localization of function in each general body area is presented in Table III. The frequencies with which each body part was mentioned in the localization of hunger, thinking, anger, happiness, love and sadness were compared using Cochran's Q test (Siegel, 1956). The data for each body part were analyzed twice, first with the data from all 6 of the functions listed above and then including only the four emotions. This was done because the low variability of response to questions on hunger and thinking contributed to significant results in the analyses to be reported when, in fact, for some body parts, no significant differences were obtained among the various emotions.

As was mentioned previously, the responses were analyzed and reported in terms of the five general body areas (non-localized, head, face, body, limbs). Specific body organs are reported only when they were mentioned by at least five

TABLE III

THE SIGNIFICANCE OF MAJOR BODY AREAS:FREQUENCY OF RESPONSE BY AGE AND FUNCTION

A. Non-localized

Grade	Anger	Happiness	Love	Sadness	Hunger	Thinking	With Hunger and Thinking	Without Hunger and Thinking
1	6	4	5	4	-	1		
4	5	4	5	5	-	-		
7	1	3	1	-	-	-		
10	1	5	1	3	-	1		
College	1	2	3	3	-	-		
Combined	14	18	15	15		2	Q=36.42 $p<.001$	Q=1.01 n.s.

TABLE III (CONTINUED)

B. Head

Grade	Anger	Happiness	Love	Sadness	Hunger	Thinking	With Hunger and Thinking	Without Hunger and Thinking
1	6	3	1	3	1	15		
4	4	3	4	5	-	16		
7	6	2	4	6	-	15		
10	3	4	5	4	1	8		
College	2	4	2	4	1	12		
Combined	21	16	16	22	3	66	Q=139.02 p < .001	Q=2.05 n.s.

C. Face

1	-	4	-	4	1	-		
4	1	5	2	-	4	-		
7	1	4	1	1	-	-		
10	3	3	4	1	1	1		
College	1	6	4	2	2	2		
Combined	6	22	11	8	8	3	Q=27.17 p < .001	Q=17.13 p<.001

TABLE III (CONTINUED)

D. BODY

Grade	Anger	Happiness	Love	Sadness	Hunger	Thinking	With Hunger and Thinking	Without Hunger and Thinking
1	1	4	10	4	14	-		
4	2	3	5	5	12	-		
7	3	7	10	6	16	-		
10	6	4	6	5	14	-		
College	7	4	6	6	13	1		
Combined	19	22	37	26	69	1	Q=144.98 p <.001	Q=12.40 p <.01

E. Limbs

1	3	1	-	1	-	-		
4	4	1	-	1	-	-		
7	5	-	-	3	-	1		
10	3	-	-	3	-	6		
College	5	-	1	1	-	1		
Combined	20	2	1	9	-	8	Q=48.30 p <.001	Q=33.66 p <.001

subjects in the localization of a single function.

Non-localized responses. Hunger and thinking were found to elicit the fewest non-localized responses (hunger, 0; thinking, 2 [2% of all 'thinking' responses] ; anger, 14 [17%]; love, 15 [19%], sadness 15 [19%], happiness, 18 [22%]; $Q=36.42, df=5, p < .001$). No differences were found among the four emotions in the number of non-localized responses. These comprised 19% of all responses to the emotion questions.

Head. One-hundred and forty-four (30%; See Table III, Part B) of all responses were in this category. Thinking was found to be associated with the head most often (66 [46% of all head responses]) and hunger least often (3 [2%]; sadness, 22 [15%]; anger 21 [14%] ; happiness, 16 [11%]; love, 16 [11%] ; $Q=139.02, df=5, p < .001$). When only four emotions were considered, no differences were found in the frequency of localization in the head. These comprised 24% of all responses to the four emotion questions.

The specific part of the head that was mentioned most often was the brain. The distribution of brain responses was similar to that of the most general category head. The brain was most often associated with thinking (28 responses) then anger (7), sadness (5), love (4), happiness (1) and hunger (0; $Q=82.69, df=5, p < .001$). No differences between the four emotions were found in the frequency of brain responses.

Face. Fifty-eight (12%; See Table III, Part C) of all responses were localized in the face. This was found to differ between functions. The face was most often associated with happiness (22 [39% of all face responses]) and least often with thinking (3 [5%]; love, 11 [19%]; sadness, 8 [14%]; hunger 8 [14%]; anger 6 [10%]; $Q=27.17$, $df=5, p < .001$). Localization in the face comprised 15% of all responses to the four emotion questions.

The specific part of the face which was mentioned most frequently were the eyes (15 [26% of all face responses]). The eyes were found to be most often associated with love (7 responses), then sadness (5), anger (1), happiness (1), hunger (0) and thinking (0; $Q=19.70, df=5, p < .01$).

Body. The localization of function in the body comprised 36% (174) of all responses (See Table III, Part D). The body was most often associated with hunger (69 [40% of the body responses]) and love (37 [21%]), then sadness (26 [15%]), happiness (22 [13%]), anger (19 [11%]) and thinking (1 [1%]; $Q=144.98, df=5, p < .001$). The relatively strong association of the body with love also contributed to significant analyses when only the four emotions were considered ($Q=12.40$, $df=3, p < .01$). Localization in the body comprised 33% of all the responses to the emotion questions.

The specific organs of the body which were most frequently mentioned were the heart and stomach. The heart was most often associated with love (24 [44% of the heart responses]), then sadness (14 [27%]), happiness (10 [19%]), anger (5 [10%]), thinking (0) and hunger (0; Q=63.05,df=5, $p < .001$). The stomach was most often associated with hunger (66 [67%] of the 98 stomach responses) and was least often associated with thinking (0) whereas it tended to be equally associated with each of the four emotions (happiness, 9 responses [9%]; love, 9 [9%]; anger, 8 [8%]; sadness 6 [6%]; [Q=218.65,df=5, $p < .001$]).

Limbs. Forty (8%; See Table III, Part E) of the responses to questions on the localization of function were in the limbs. The limbs were associated primarily with anger (20 [50%], happiness of the 40 limb responses), then sadness (9 [23%]), thinking (8 [20%]), happiness (2 [5%]), love (1 [2%]) and hunger (0); ($Q=48.30,df=5$ $p < .001$). The results of this analysis were also significant when only the four emotions were compared ($Q=33.66,df=3$, $p. < .001$). Localizations in the limbs comprised 10% of all responses to the four emotion questions.

The association of anger, sadness and thinking with the arms and legs differ somewhat among themselves. Anger was primarily associated with the arms. Sixteen (80%) of

of the 20 limb responses to this emotion were specifically in the arms. Sadness appears to be associated primarily with the legs. Seven (78%) of the 9 limb responses to sadness were in the legs. The 8 limb responses to thinking were evenly divided between the legs and arms.

Summary. The data presented thus far on age-related and function-related trends in the naming of each body area can be summarized as follows:

1. The tendency to localize functions increased with age.

2. Hunger and thinking were more often localized than any of the emotions.

3. The head was most often associated with thinking and the stomach with hunger.

4. 19% of all responses to the emotion questions were non-localized, 24% were localized in the head, 15% in the face, 33% in the body, and 10% in the limbs.

5. The following differences in the assignment of emotion to different body parts were found:

   i. In general, the face as a whole was most often associated with happiness. The eyes were most often associated with sadness and love.

   ii. The body, especially the heart, was most often associated with love.

   iii. The limbs were most often associated with anger. Of the limb responses, the arms tended to be associated with anger and the legs with sadness.

Developmental Trends in the Localization of Specific Functions

This section deals with developmental trends in the localization of hunger, thinking and each of the emotions. The data are presented in summary form with specific body parts reported only when they were mentioned by five or more subjects in the localization of the same function. Detailed data on the localization of each function may be found in Appendix B.

The data in this section were tested for significance using chi-square and Fischer's exact probability tests. A chi-square was used whenever the data met the assumptions of the test, that is, when the expected frequency for each cell was at least 5. When the data did not meet this criterion Fischer's exact probability tests were used. There were several instances in which it was necessary to combine adjacent grades (e.g., grades 1 and 4 vs. 7, 10 and college) in order to make statistical analysis possible.

Hunger. Every subject in this study localized hunger (as evidenced by the lack of non-localized responses in this category in Table III, Part A). Eighty-three percent (66) of the responses to hunger were in the stomach. There were no clear developmental trends in the localization of hunger.

Thinking. Thinking, like hunger, was localized by virtually all subjects. Eighty-five percent of the 78 localized responses were in the head (especially the brain). There was a trend for this to vary with age. An examination of Table III, Part B reveals that 46 (98%) of the 47 localized responses in the three younger grades (1, 4, and 7) were in the head whereas only 20 (66%) of the 31 older subjects localized thinking in the head (χ^2=15.78,df=1, $p < .001$).

The tendency to localize thinking specifically in the brain decreased with age. Twenty-one (68%) of the 31 localized responses in the first and fourth grades were specifically in the brain, as opposed to 7 (15%) of the 47 localized responses in the three older grades (χ^2=27.65, df=1,$p < .001$).

The decrease in head responses found in the older grades was offset by an increase in limb response. Tenth grade subjects tended to localize thinking in the limbs more often than subjects in other grades. Six (40%) of their 15 localized responses were in the limbs whereas this occurred only twice in all other grades combined (χ^2=17.60, df=1, $p < .001$). Each of the subjects localizing thinking in the limbs explained that this was because they often feel restless when doing nothing but thinking and hence

they want to doodle, figit or take a walk.

Anger. As Table III, Part A indicates, with increasing age more subjects tended to localize anger in some body area. The biggest increase occurred between grades 4 and 7. Twenty-one (66%) of the 32 subjects in grades 1 and 4 localized anger as compared to 45 (94%) of the 48 subjects in the three oldest grades (χ^2=10.50,df=1,p < .001).

Among the responses which were localized, it appears that the localization of anger in the head decreases with age fairly consistently (see Figure I). While 6 (60%) of the 10 localizing subjects in the first grade localized anger in the head, only 2 (13%) of the 15 localizing subjects in the college sample localized anger in the head (p=.05, Fischer's exact probability). The data for the remaining grades were: grade 4, 4 responses (36% of the localized responses in this grade); grade 7, 6 (46%); grade 10, 3 (20%). As can also be seen in Figure I, the localization of anger in the body shows a similar but opposite trend. Only 1 of the 10 localizing subjects in the first grade localized anger in the body whereas 7 (47%) of the college sample localized anger in the body (p=.06, Fischer's exact probability; grade 4, 2(18%); grade 7, 3(20%); grade 10, 6 (40%)). No consistent developmental trends were noted in the localization of anger in the limbs or face.

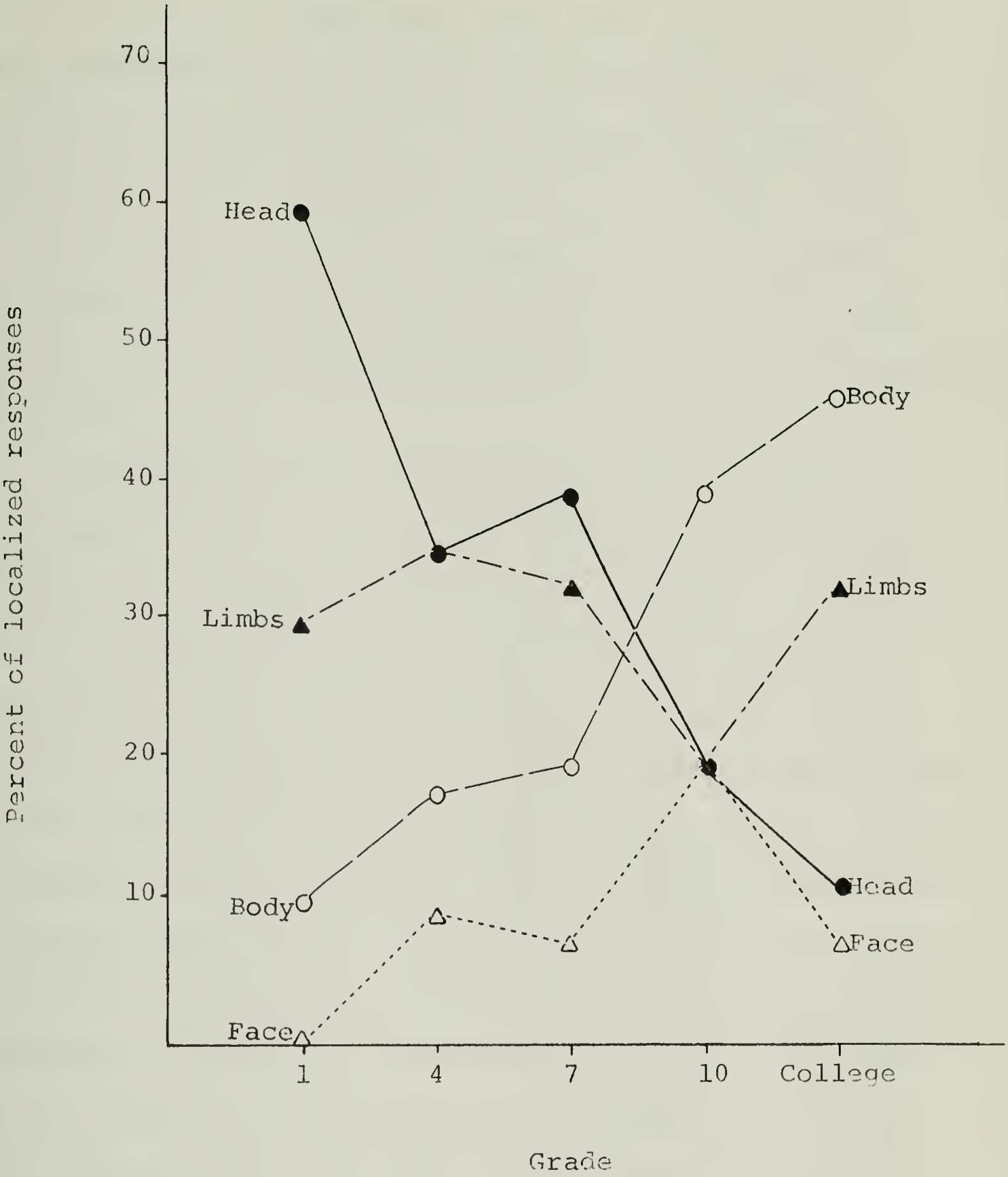

Figure I. Anger: Body areas used by localizing subjects.

The specific body parts most often associated with anger were the arms (19 of the 66 localized responses), brain (7) and stomach (7). No developmental trends were found in the localization of anger in the arms. Subjects in all grades connected the arms to behavioral tendencies associated with anger. The localization of anger in the brain, like the localization of anger in the head, decreased with age.

Happiness. Data on the localization of happiness is presented in Figure II. Unlike the other three emotions, there were no consistent developmental trends in the tendency to localize happiness (See Table III, Part A). Twenty-four (75%) of the 32 subjects in grades 1 and 4 localized happiness and 37 (79%) of the 48 subjects in the older grades localized happiness. As the curves in Figure II indicate, no consistent body part was uniquely associated with the experience of happiness in any of the age groups sampled. Furthermore, the number of subjects showing non-localized responses to happiness was virtually identical to the number localizing happiness in each of the major body areas under study, with the exception of the limbs. Examination of Table III reveals that 18 subjects showed non-localized responses to happiness, 16 localized this emotion in the head, 22 in the face, 22 in the body and

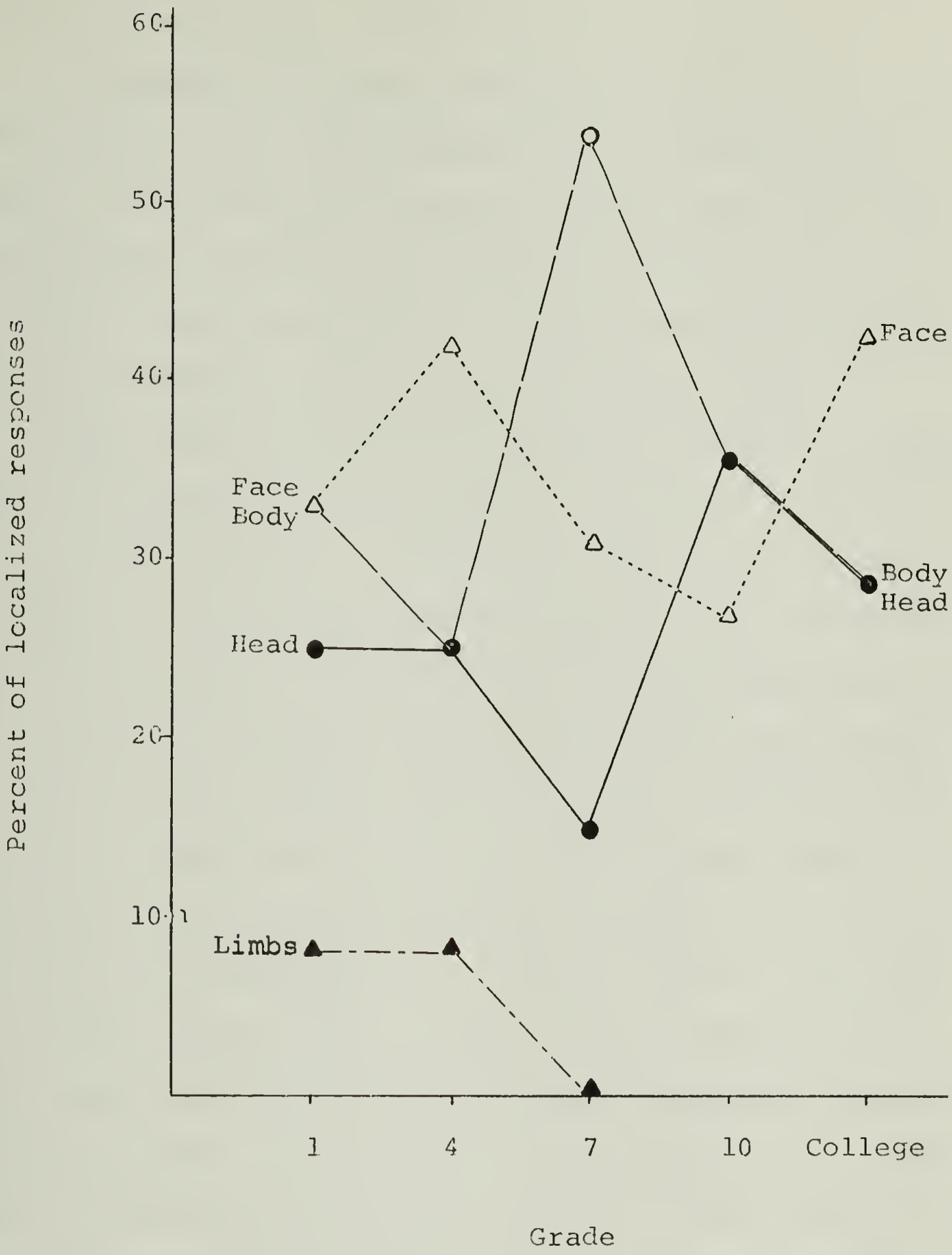

Figure II. Happiness: Body areas used by localizing subjects.

only 2 in the limbs. (χ^2=17.0,df=3, p < .01).

In general, the localization of happiness was diffuse and did not tend to be focussed on any particular body area. The specific body parts that were most often associated with happiness were the heart (10 of the 62 localized responses) and stomach (9). No age differences were found in the localization of happiness in these organs.

Love. The data on the localization of love is presented in Figure III. The tendency to localize love changed as a function of age. Twenty-two (69%) of the 32 subjects in the first and fourth grades localized love, 30 (94%) of the 32 subjects in the seventh and tenth grades localized love (p =.08, Fischer's exact probability) and 13 (81%) of the college subjects localized love. The localization of love in the body decreased after the first grade. Ten (91%) of the 11 localized responses in the first grade were in the body, as opposed to 27 (50%) of the 54 localized responses in the older 4 grades (χ^2=6.12,df=1,p < .02). The localization of love in the face increased in the two oldest grades. Three (8%) of the 37 localized responses in the three youngest grades were in the face whereas 8(29%) of the 28 localized responses in the tenth grade and college samples were in the face (χ^2=4.87,df=1,p < .05). No developmental differences are noted in the localization of love in the head or limbs.

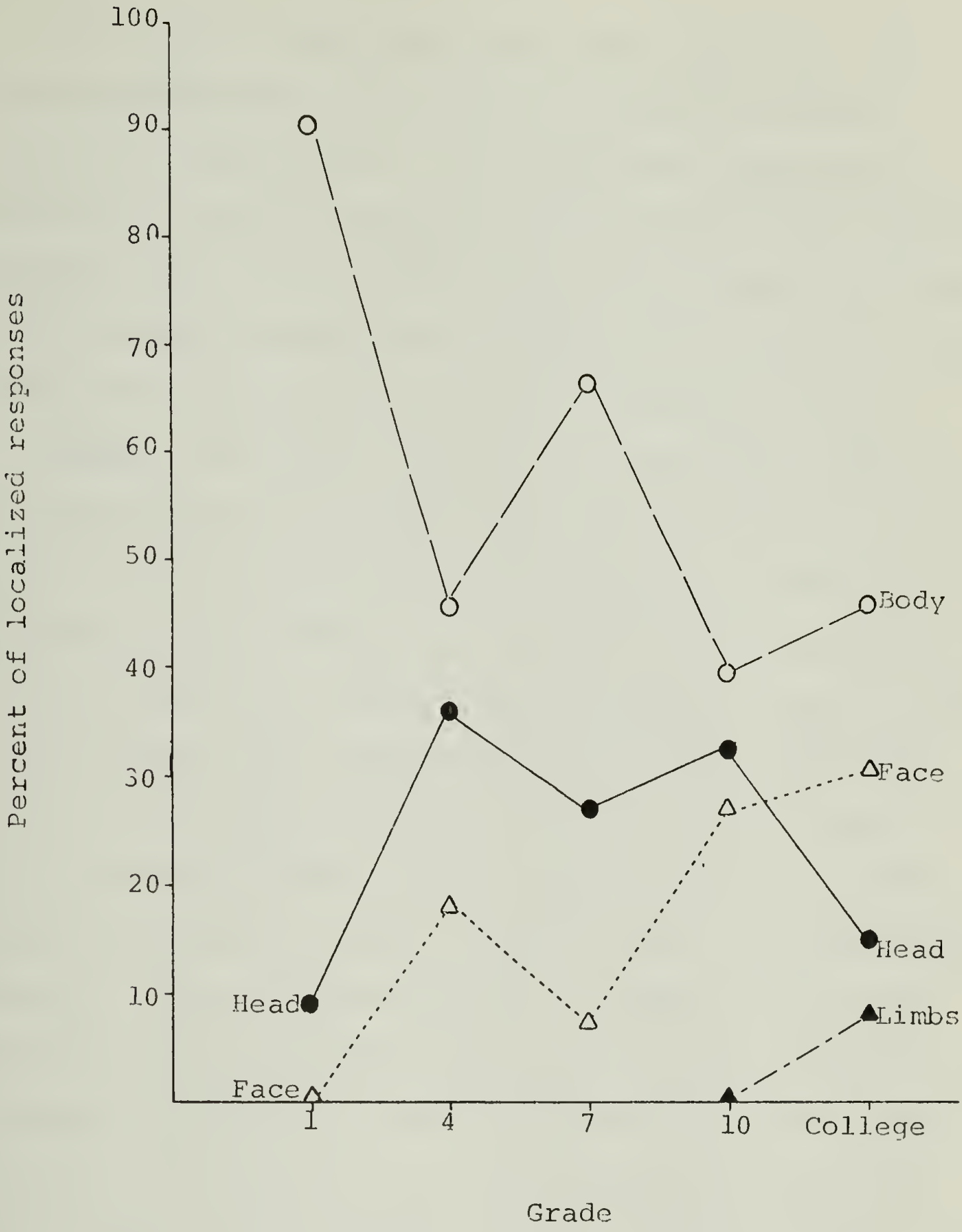

Figure III. Love: Body areas used by localizing subjects.

The specific body parts most often associated with love were the heart (23 of the 65 localized responses), stomach (12) and eyes (6). No significant developmental trends were found in the use of these specific body organs although there was a tendency for the localization of love in the stomach and heart to decrease with age and for the localization of love in the eyes to increase with age.

Sadness. The data on the use of major body areas in the localization of sadness is presented in Figure IV. As with love, the tendency to localize sadness varied as a function of age. Twenty-three (72%) of the 32 subjects in the first and fourth grades localized sadness, all 16 (100%) of the seventh grade sample localized sadness (χ^2=3.85, df=1, p. $<$ .05) and 26 (81%) of the 32 subjects in the tenth grade and college sample localized sadness. The single developmental trend observed in the localization of sadness is that the localization of sadness in the face decreased after the first grade. Four (25%) of the 12 localized responses in the first grade were in the face as compared to 4 (8%) of the 53 localized responses in all other grades (χ^2=3.75,df=1, p $<$.10). Three of the 4 localizations of sadness in the face given by the first grade subjects were specifically in the eyes which they associated with crying.

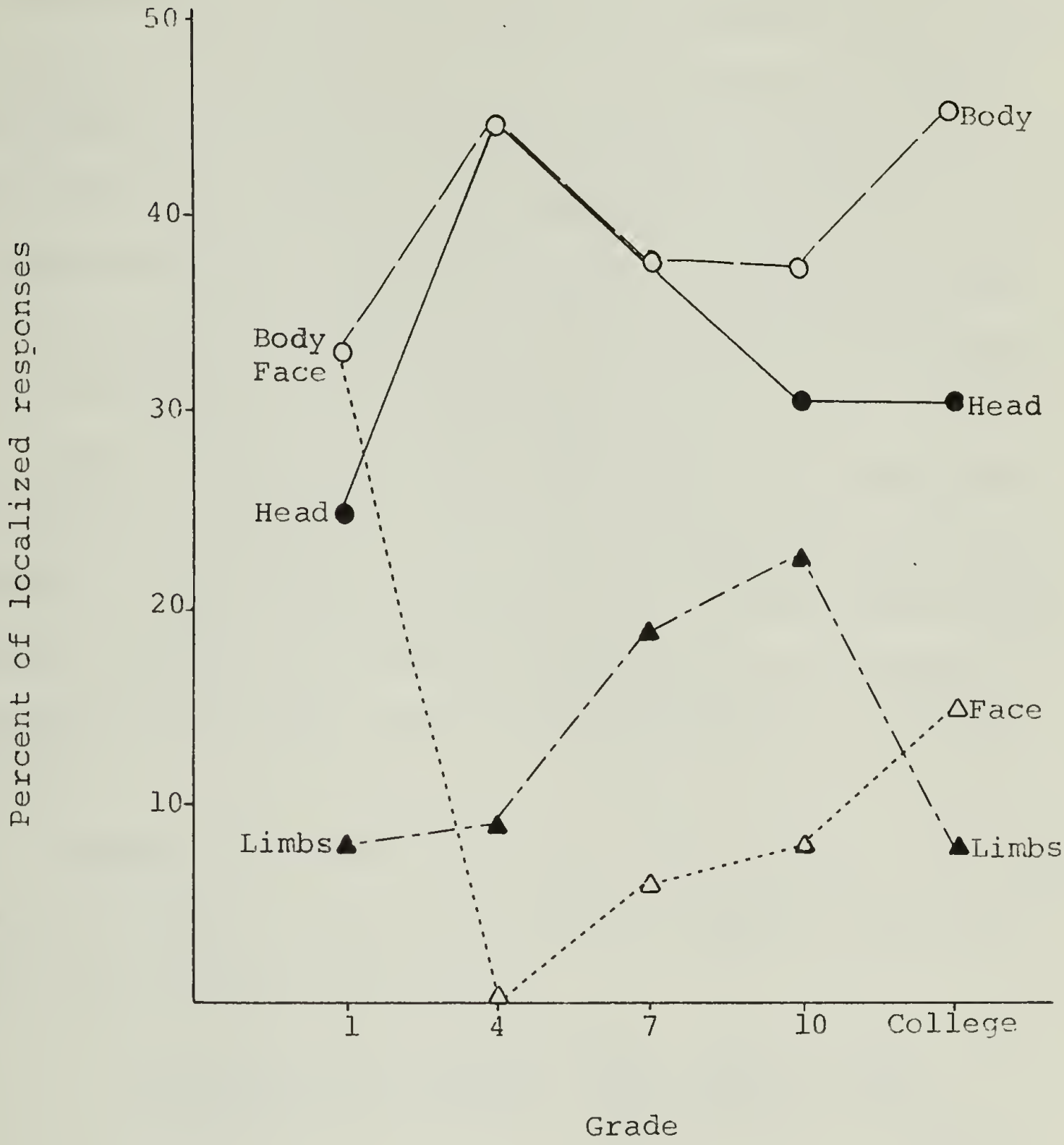

Figure IV. Sadness: Body areas used by localizing subjects.

Since the first grade sample was the only group which deviated from the others they were excluded from a general comparison of body parts in the localization of sadness. Considering the localization of sadness in grades 4, 7, 10 and college it appears that sadness is more likely to be localized in the head (19 responses) and body (22) than to be either non-localized (11) or localized in the face (4) or limbs (4; $\chi^2 = 16.14, df=1, p < .001$).

The specific body organs most often associated with sadness were the heart (12 of the 65 localized responses), legs (7), eyes (5) and stomach (5). No significant developmental trends were observed although the localization of sadness in the eyes tended to decrease after the first grade.

Summary. The data reported in this section on developmental trends in the localization of specific functions can be summarized as follows:

1. There were no developmental trends in the localization of hunger. This function was localized in the body, especially the stomach.

2. The tendency to localize thinking (in any body area) remained constant throughout the age span examined. Thinking was most strongly associated with the head. The localization of thinking in the head decreased somewhat in the older grades while the localization of thinking in the limbs increased.

3. The tendency to localize anger increased with age. In addition, the localization of anger in the head decreased with age while the localization of anger in the body increased.

4. There were no developmental trends in the localization of happiness. This emotion was variously located in all parts of the body except the limbs.

5. The tendency to localize love increased until the seventh grade. Love associated most often with the body, especially the heart. The localization of love in the body decreased with age while the localization of love in face, especially the eyes, increased.

6. The tendency to localize sadness increased up to the seventh grade. Sadness tended to be localized in the head and body. The localization of sadness in the face decreased after the first grade.

C H A P T E R V

DISCUSSION

Overall, the results of this part of the study were generally as would be expected from the theoretical considerations outlined above. It is unfortunate, however, that in the reduction of the data to a form which allowed for quantitative analysis, much of the flavor of the subjects reports was lost. This section therefore serves two purposes: first, to discuss the results in relationship to the hypotheses upon which the study was based and second, to relate the results more fully to the subjects' experience by allowing the subjects to speak for themselves.

The first prediction that was made was that subjects of all ages would localize thinking in the head and hunger in the stomach. This was based upon findings by Nagy (1963) and Schilder and Wechsler (1935) which indicate that children's early learning about the interior of their bodies is centered around the intellectual functions of the brain and digestive functions of the stomach. In addition, the large number of body metaphors relating to hunger and brain metaphors relating to thinking suggested that these functions might be localized as soon as their

meaning is understood. This was, in fact, found to be the case. All subjects localized hunger and the vast majority (80%) of these localizations were in the stomach. Similarly, thinking was localized by virtually all subjects and the vast majority of these localizations were in the head.

The problem of the localization of thinking, however, proved to be more complex than the localization of hunger. Younger subjects, moreso than older subjects, tended to localize thinking specifically in the brain, which they often could only vaguely localize in the head. (For example, one first grade female stated: "I don't know where it is in the head. The only part I know is that its in the head"). This is significant in that it indicates that functions become localized symbolically prior to even a rudimentary understanding of the organ of localization. In older subjects this symbolic localization becomes more refined and is expressed in the localization of thinking in various specific parts of the head.

The tendency of the tenth graders to localize thinking in the limbs deserves comment. All of these subjects attributed this to feelings of restlessness which are associated with the process of thinking:

> My feet just get itchy on the bottom. You just get up, walk, go out, drive a car, do something. (Tenth grade female)

> My feet...because they're underneath (the desk).. kind of restless, they don't know what to do because they're so big. (Tenth grade male)

Although the meaning of this anomolous localization of thinking is not clear, one could speculate that for this age group the tasks of adolescence involving career goals, personal independence and social identity (See Mussen, Conger and Kagan, 1963; Erickson, 1968) make the content of thought particularly problematic, Moreover, it is at this age that the adolescent begins to fully attend to and explore his social and interpersonal environment. Because of this increased frequency of social involvement, activities which require solo performance might be regarded as distracting, boring and unimportant. It may be for these reasons that the tenth grade student experiences a persistent restlessness when required to think. This restlessness may be expressed in a heightened salience of limb movements during periods of thinking. (Compare this, for example, with the college male who declared that "thinking is the epitome of your existence").

Many subjects, across age groups, described the sensation of thinking as feeling "like gears turning". One fourth grade subject (female) gave this particularly

striking description:

> My brain feels like ferris wheels or something. It just has monsters, houses, flowers, the beach, music and monsters and things. So it swings in my mind and stops at which one I want to pick.

The second prediction was that with increasing age, there would be an increase in the tendency to localize emotion. This was found to occur with all emotions except happiness (discussed below). The clear localization of hunger and thinking which occurred in even the youngest subjects suggests that the trend towards increased localization found may reflect an evolution in the child's concept of emotion rather than an inability of the younger subjects to conceptualize functions as being localized. In short, it appears that different parts of the body do become associated with different states as the child acquires adultlike conceptions of emotion.

The third hypothesis was that with increasing age, emotions would become increasingly localized in the body rather than the head. This was found to be true only in the case of anger. Younger subjects tended to localize anger in the head, which they said "hurts" and feels "terrible" and "rotten". Older subjects localized anger in the body, especially the stomach and chest, which

were almost invariably described as feeling tense. Some subjects attributed this tension to the problem of controlling anger:

> Well, everytime I get angry my legs start stiffening up and I really-my muscles always contract when I get mad and I have to suppress my anger which is pretty hard. I feel it most in my stomach (Seventh grade male).

The age trends found here on the localization of anger stand in contrast to those found by Wolman, Lewis and King (1972). Using a highly similar set of questions, they found an increase in the proportion of head localizations between their young (5-7 years) and middle (8-9 years) group and a slight, nonsignificant, decrease between their middle and older (10-13 years) groups. Wolman et al found that the proportion of stomach localizations decreased between the young and middle groups and increased slightly between the middle and older groups. Although it is difficult to pinpoint the source of the discrepancy between the two studies, there are several factors which may have been contributory. In the first place, although the interview questions used in the studies were virtually identical, the criteria for localization used by Wolman et al were not clearly reported. In the present study, a response was considered to be

localized if it was given to any of the interview questions. Restricting the criterion for localization exclusively to responses to the most direct localization question (i.e. where in your body do you feel it most when you feel___?), which occurred relatively late in the set of questions for each function, may have eliminated responses that were included in the present study. Secondly, in the present study, only the primary localization given by each subject for each function was considered. Again, it is not clear how Wolman et al treated multiple localizations. Finally, although Wolman et al did find an increase in the proportion of head responses between their youngest and middle groups (approximately first and fourth grades respectively), there was a slight decrease in head responses between the middle and oldest groups (fourth and seventh grades). It may have been the case that sampling a wider range of ages would have revealed an overall decrease rather than increase in the proportion of head responses especially after the fourth grade.

In general, the case of anger provided the most clear support for the notion that emotions are socially constituted in such a way as to imply involuntary behavior. Many of the subjects expressed sentiments close to that

of the fourth grade female who declared that "anger is the cause of everything bad". Concern with controlling angry behavior was revealed as early as the fourth grade and there were numerous instances in which parts of the body (especially the limbs) were endowed with the ability to initiate behavior independent of the rest of the person;

> (localized anger in hands): They feel like they're ready to kill somebody. (Fourth grade male)
>
> (heart): It's like a big bubble that gets hotter and hotter and it breaks and sends all this stuff throughout the rest of your body. It makes you want to punch somebody or scream. (College female)
>
> My arms...they just get all tied up...they just stay still and they just get so they feel that they could punch somebody but I never do cause they'd punch me back. (Seventh grade female)

One male college student who localized love in the head because "it's one of our human intellectual functions" contrasts it with anger by saying:

> ...brings about the animal in you. I get some feeling of maybe bashing in the object of my anger...a need to show the other person he was wrong. (My body) feels a little more instinctive, act on impulse, umm, irrational. (My hands) feel like they know what they've got to do and they're going to do it maybe almost as if they're separate entities.

Although anger was most often likened to instinctual and involuntary behavior, other emotions, especially love, were described in terms of their childlike qualities:

> I feel sort of happier or younger than, you know, you might feel sort of like a three year old. (Seventh grade female)
>
> Interviewer: What does your body feel like when you feel love?
> Subject: I don't know, it feels smaller.
> Interviewer: Smaller?
> Subject: yeah, you know, like a little kitten or something. (Tenth grade female)

With the notable exception of the subject quoted above, most subjects described love in bodily terms, imputing symbolic functions either to the heart or the stomach:

> The heart-the heart, I've always thought, contains all the love. (First grade female)
>
> (heart): I would describe it (love) as being soft, smooth pliable, sort of something that you can form, not as hard as clay...something that you can just put your hands around and feel smooth. (College male)
>
> (stomach): When you lose love you feel an emptiness, you have the love, you feel fulfilled, everything, everything's there that you need. For love it would be very fulfilled, I just ate a fantastic meal. I can't eat anything else. You know, I'm just full. (Tenth grade male)

The large proportion of body references given by the first grade subjects in the localization of love indicates that the body symbolism associated with love is learned by many subjects even before the ages examined in this study. This is most likely connected with the prevalence of the heart (♡) as a cultural symbol for love. In fact, of the four emotions studied, only the emotion

of love has a symbol with which it is almost isomorphically related. This could, perhaps, be traced to the cultural importance of love in the creation of close interpersonal relationships including, of course, the relationship between parent and child.

While the body was most often the locus of localization of love at all ages, love was also localized in the face, especially the eyes, by the older subjects. This symbolic emergence in a part of the body particularly concerned with interpersonal communication is interesting for it parallels Falkowski's (1975) finding that reciprocity first becomes intergral to the concept of love during adolescence. It appears, that along with the expansion and elaboration of the concept of love comes an elaboration of its physical symbolism.

While the data obtained on the localization of sadness and happiness do not directly support the hypothesis that emotions tend to be localized in the body rather than the head, they do provide fertile ground for speculation. Sadness was found to be localized equally in the head and body at all ages and was localized in the face only in the youngest subjects. This paucity of face responses in the localization of sadness was somewhat surprising in light of the common association (which was

made by first graders) of sadness with crying and the more general emphasis on the expressive functions of the face (cf., Izard, 1971). The finding here, along with the general proscription against crying in all but the most limited contexts, suggests that most outward manifestations of sadness are not socially condoned. A consideration of the nature of sadness, especially in contrast to other emotions, suggests that the deemphasis on the expression of sadness may, in fact, be related to the tendency to localize sadness in both the head and the body.

Sadness, in contrast to anger and love, may be considered to be an "internalized" rather than "other-directed" emotion. We are angry <u>at</u> someone or something and in love <u>with</u> someone and implied in this is the idea that the emotion somehow affects the behavior of the other. The immediate social consequences of sadness, on the other hand, are not nearly as clear. While the expression of sadness by young children may serve to modify the behavior of others, the expression of sadness by adults is likely to be less effective in this regard. We are sad <u>about</u> something but this event does not usually change as a result of our sadness. The consequences of sadness, especially in adults, remain, in large part, internal to the person.

Similarly, while the duration of the experience of anger and love depends, to a large extent, on its situational context, there may often be no such external turn of events setting the boundaries for the duration of sadness which tends to be "coped with" and "gotten over" individually. This suggests that the loss of personal control frequently attributed to anger and love may be less strongly associated with sadness. It is here suggested that the emphasis on personal management of the experience of sadness is reflected both in the localization of sadness in the head as well as body and in the deemphasis of the face in the localization of sadness.

Unlike sadness, the responses on the localization of happiness were evenly distributed between non-localized responses and localization in the head, face or body. Happiness, therefore, was the least specifically localized of all the emotions studied. Subjects descriptions of the experience of happiness focussed on generally "good" feelings in the body and on increased energy levels and feelings of omnipotence. Subjects in all grades used phrases such as "all hyped up", "it's like I could run a mile" and "feels like you're king of the world".

Both the lack of specificity found in this study and the lack of bodily idioms associated with happiness are revealing in that they suggest that the function and experience of happiness may be somewhat different than that of other emotions. Whereas anger, and to a lesser extent love, may be considered to be acute states whose expression is appropriate to fairly circumscribed contexts of limited duration, happiness may be conceptualized as a kind of "meta-state", a goal to be strived for which does not interfere with, and in fact may motivate, other personal, social and occupational activities. The lack of bodily specificity in the localization of happiness, therefore, may have to do with the relative lack of contextual specificity to which happiness is appropriate.

Conclusion

Taken together, the body of data gathered in this study are significant for our understanding of affective experience. As well as illustrating an alternative to a strictly biological approach to the localization of function, the data may enhance our models of emotional functioning by pointing to important dimensions in the experience of emotion. For example, the localization of anger and love in the body and the more nonspecific localization of

happiness and sadness suggests that one important distinction between these two sets of emotions may be the relative length of their duration or, in other words, the relative episodic vs. disposition nature of their expression. Both anger and love may typically be intensely experienced and highly situationally dependent. These emotions may serve to disrupt or stop ongoing activity and therefore both allow for greater attention to be paid to one's bodily activity and demand it as a rationale for the cessation of behavioral sequences. Alternatively, while happiness and sadness may provide a particular affective "wash" or coloring to ongoing activity, the emotions themselves do not necessitate the total absorption of the individual. In this case, there is less of a need to focus on bodily cues and less opportunity to do so. While this is but one implication of the localization data, the complexity of the results and the richness of the subjects' reports indicate that a further examination of the localization of emotion may be one avenue of insight into the nature of emotional experience.

PART II

C H A P T E R V I

THE LOCALIZATION OF THE SELF:INTRODUCTION

The problem of defining and explicating the nature of the self is one that has been tackled from a variety of theoretical perspectives each of which has contributed a slightly different model of self functioning. The purpose of this chapter is not to review the numerous conceptions of the self but to focus on two interrelated aspects of the self which have been mentioned by a variety of theorists and which have relevance for the bodily localization of the self and the experience of emotion. Briefly stated, these are the notions of the self as the source of volitional behavior and the self as the object to which responsibility for behavior is assigned.

The notion of the self as doer, or as the source of intentional behavior, illustrated in this statement from James (1890) and is also included in the work of other theorists (e.g., McClelland, 1951).

> What is this self of all other selves? Probably all men would describe it in much the same way up to a certain point. They would call it the ACTIVE element in all consciousness; saying that whatever qualities a man's feelings may possess, or whatever content his thought may

> include, there is a spiritual something in him which seems to GO OUT to meet these qualities and contents, whilst they seem to COME IN to be received by it. It is what welcomes or rejects....It is the source of effort and attention, and the place from which appear to emanate the fiats of will. (p. 297)

This aspect of self is experienced as having an executive function, as directing and initiating behavior.

Cooley (1902; see also Freud, 1923; Ausubel, 1958; Piaget, 1930) traces the origin of this aspect of self awareness to the child's early opposition to the environment:

> Instinctive self-feeling...appears to be associated chiefly with ideas of the exercise of power, of being a cause, ideas that emphasize the antithesis between the mind and the rest of the world. The first definite thoughts that a child associates with self feeling are probably those of his earliest endeavors to control visible objects - his limbs, his playthings, his bottle and the like. (Cooley, 1920, pp. 145-146)

The child therefore, becomes aware of himself through the active initiation of behavior.

While the distinction between the self and the environment is essential to a self-system, it is only the first step in the formation of a sophisticated concept of self. Subtler distinctions also become drawn between the "real" self and the qualities or behaviors that happen to be associated with the person in any particular instance.

(Consider, for example, the statement "I have a headache, I'm not myself today"). This type of distinction is essentially a judgement of the intentionality of a behavior and an attribution of responsibility and it is predicated on a system of values. Behaviors which are prized, for example, may be subjectively interpreted as being intentional and thus become associated with the source of intentional behavior, the self. Since, at least in contemporary Western culture, intentionality implies responsibility, this kind of interpretation means that responsibility for the behavior may be attributed to the self. Similarly, those actions which are not valued may, within limits, be excused as not being intentional. The self, then, has been dissociated from the initiation of the behavior and consequent responsibility for it ("It wasn't my fault, I didn't mean it"). Perhaps Turner (1968) best summarizes this:

> The social self-as-object is <u>that object which is held responsible and assigned credit</u>...The content of the self is formulated out of those elements for which credit and responsibility are assigned... The self-conception does not arise passively but in conjunction with vital activity. The individual does not simply accept credit and responsibility: he pursues credit and seeks to avoid responsibility for unfortunate happenings. He seeks credit especially in those activities he values most highly, and he seeks to escape responsibility for poor performance in activities he values most negatively.

> As he acquires the idea of person and self he fills in the self with those contents from which he seeks and claims credit and reluctantly takes responsibility for those items from which he cannot escape. (p. 100)

The Self and Emotion

When the concept of self is formulated in terms of control and responsibility, its relationship to emotional behavior becomes clear. If, as was suggested in the previous section, emotional behavior is socially devalued, then one would want to deny responsibility for its initiation. One way to deny responsibility for a behavior is to take it out of the purview of the self. Lee (1950) describes the result of this process.

> When it comes to the non-physical aspects, we note a reflection of the dualism of mind and matter and the heirarchy which is a corollary of this. "Passions" are considered lower; I FALL in love, I FALL into a passion or a rage. I delve into my unconsciousness, which is implicitly underneath; but I analyze my conscious, where I do not need to evacuate, since it is on my level. I lose and recover my consciousness or my reason; I never FALL into consciousness or reason. I control my emotion, but I do not control my consciousness or reason. Neither do I control my will; I exercise it. The self is most nearly identified with consciousness and reason and will...(p.539).

Implied in the Western concept of self, then, is a duality between the self and emotion. While actions are the products of the self, passions emerge independently and overcome the self.

The Self in Cultural Perspective

Implicit in the discussion above is the idea that although the specific content of the self-concept is based upon social values and consequently would be expected to differ with variations in value-system, the existence of a concept of self is somehow intrinsic to human functioning. Before considering the localization of the self, however, it is necessary to put the model of self sketched above in cultural perspective and to point out that the idea of self has developed historically and varies culturally. The Homeric Greeks, for example, divided psychic processes into a variety of separate functions. Their vocabulary contained no word, however, for self as a single entity or function which would unify and motivate behavior (Snell, 1953). Similarly, words describing mental or conscious acts (such as regret or desire) were absent. The inner motivational forces which impinge upon, and the willful action which emerges from the contemporary psyche were understood by Homerics as deriving from external forces, especially the gods (See Jaynes, 1976 for a fascinating discussion of this). Jaynes (1976) and Snell (1953) have both argued that the self, as it is currently understood, essentially did not exist in early Greek culture.

The Wintu (American) Indians provide an interesting contrast for the Homeric lack of self-consciousness. Whereas the early Greeks had virtually no sense of self, the Wintu self is fluid and extensive and goes beyond the bounds of the contemporary Western self. Lee (1950) writes:

> The Wintu conception of the self then differs from our own in that it contains the total person and the activities of all its aspects, and in that it fades out gradually and without distinct demarcation. It is not clearly opposed to the other, neither is it clearly identical with or incorporated in the other. In most occassions it participates to some extent in the other, and is coordinate with the other; where we see a one-way relationship from self to other, an assertion of the self upon the other, the Wintu see a togetherness, with, at most, a stressed point of view. (p. 541)

Commensurate with this extended concept of self, the Wintu have no separate word for self but designate self-relatedness within the grammar.

It appears that conceptions of the self, even its very existence, differ radically among cultures. This cultural specificity suggests that the self is a product of social evolution.

The Localization of the Self

The thrust of the discussion so far has been that the existence, form and content of the self have been fashioned culturally. Following the discussion on the localization of function, it would be expected that the localization of the self would symbolically reflect this culturally created self.

While there has been a paucity of empirical work on the localization of the self, several theorists have speculated about the issue and most have concluded that the self is localized in the head. James (1890), for example, observed that "the acts of attending, asserting, negating and making an effort are all felt as movements of something in the head", whereas when something is strongly felt "a set of feelings pour in from many body parts...and the head-feelings proper are swallowed up in the larger mass". He then concludes that "the 'Selve of selves', when carefully examined, is found to exist mainly of the collection of the peculiar motions in the head or between the head and throat (pp. 300-301). Allport (1961) suggests that the self is located in the middle of the head behind the eyes (as a "Cyclopean third eye") because of the postural strain of the head in

infancy and because of "the importance of the eyes in every spatial adjustment" (p. 113). Claparede (1924) similarly attributes this particular localization of the self to the visual nature of the human universe and Southwood (1973) traces its origin as follows:

> We all have a persistent feeling that our essential self, the part that thinks and controls us, is located somewhere in our heads behind our eyes,... Surely this feeling is a legacy from the time I learned to conceive of myself from what I saw and felt when I was watching my mother's face (pp.237-239).

Horowitz (1935) informally questioned several young children (2 to 5 years) on the localization of the self and found that the self was variously located in the head, jaw, belly and chest. He then asked his introductory psychology students the following question: If you had to locate yourself one point either within or external to your body proper, some one part that "is you", where would that point (or area) be? Of the 70 localizations he obtained, 36 were in the head, 24 were in other parts of the body and 10 were non-bodily localizations. Horowitz points out that the localization of the self in the head is influenced by social values, particularly "our educational system's inculcation of the notion of head dominance, the brain's ruling and directing the body" (p. 383).

Paradoxically, he concludes that the localization of the self is simply a "reference point" which is situationally determined and that the issue is theoretically uninteresting.

It is suggested here, however, that the localization of the self in the head is neither arbitrary nor superficial but that it neatly reflects and summarizes a self that is created along the lines of will and control. The localization of the self within a circumscribed part of the body parallels the conception of self which includes some aspects of the person but not others.

This kind of parallelism between ideas of the self and ideas of the body can also be found in the other cultural groups mentioned. Just as the early Greeks had no consciousness of self, they similarly had no concept of the body as a unified whole. Their division of psychic processes into three autonomous functions corresponds to their conceptualization of the body as comprised of separate units loosely strung together (Snell, 1953). In a similar vein, the Wintu extended notion of the self has its analoque in a highly integrated conception of the body. In this case, the entire body is considered to be self and parts of the body are designated as sites or locations on the body-self (Lee,1950).

The Present Study

It has so far been suggested that the notion of self is acquired, that it is conceived, at least in contemporary Western culture, in such a way as to emphasize those aspects of the person having to do with will, power and control, and that this limited view of the self is expressed in the tendency to localize the self in the head, the part of the body that thinks and deliberates. In addition, it has been pointed out that there is implicit in the Western conception of the self a duality between self and emotion.

The purpose of the present study is to further explore the relationship between self, emotion and body by tracing the localization of the self through different age groups. It is expected that as children mature, as the boundaries of the self become more clearly defined and the content of the self more closely reflective of social values, the localization of the self will become more highly specified. It is therefore hypothesized that:

1. With increasing age, the localization of the self becomes less difuse and increasingly centered in the head.

2. With increasing age there is a greater discrepancy between the localization of the self and the localization of emotion.

C H A P T E R V I I

METHODS

Data related to the localization of the self were collected simultaneously with the data on the localization of emotion. The sample and general procedures have been described in Chapter III. The present chapter will expand upon those aspects of the procedure having to do with the localization of the self.

Procedure. Three questions on the localization of the self were asked of all subjects; half were queried before and half after the interview on the localization of emotion. The following were the specific questions asked:

1. If you had to pick a place in your body where (person's name) is, where would you say that is? Where is your self?

2. I'd like you to imagine, for a second, that you got taken apart, you'll be put back together again in a few minutes, but, for now, we'll pretend that different parts of your body are in different places. Suppose your right leg was in one room and your left leg in another. Your left arm was in still another room and your right arm outside. Your head was in one corner of this room and your body in another. Now, where would you say you are? (O.K., you're back together again, good as new).

3. Suppose I sent you to Mars with John/Mary Jones. When you came back I noticed that the person who walked out of the spaceship had John's head and your body. Who would that person be? How about if it had your head and John's body? Who would that be?

Three questions about the self were employed in order to provide varied opportunities and contexts in which subjects could reflect upon where their self was localized. Each question poses a slightly different problem about the localization of the self. Question 1 requires the subject to freely indicate where he or she conceptualizes his or her self to be. Question 2 was included to ascertain whether that localization of the self is dependent upon the rest of the body as a whole or if it is independent of other body parts. Question 3 was included to determine the relative importance of the head and body in the conceptualization of the self.

Scoring the Data

Responses to the first and second questions on the localization of the self were scored using the list of body parts employed in Part I of this thesis. All interviews were scored independently by two raters. Out of 166 responses there were 20 disagreements, yielding an 88% rate of reliability.

Responses to the third question on the localization of the self were categorized according to whether the subject identified the conglomerate person by the ownership of the head, by the ownership of the body, or did not

identify the person as a single individual. The latter category was considered to be the equivalent of a non-localized response and also included instances in which the conglomerate person was identified as a new individual. As above, these responses were scored independently by two raters. Out of 160 responses there were six disagreements, yielding a 96.3% rate of reliability. All disagreements were resolved through discussion.

C H A P T E R V I I I

RESULTS

The data obtained on the localization of the self are presented in three parts. The first section deals with sex differences in the localization of the self. In the second section, developmental trends in the localization of the self are examined. The final section deals with the relationship between the localization of the self and the localization of emotion.

Sex Differences in the Localization of the Self

In order to examine possible sex differences in the localization of the self, the responses to the first question were grouped by body area and separated according to sex. (These data may be found in Appendix C). No significant differences (using chi-square) were found between sexes in the localization of the self in any of the major body areas (head, face, body and limbs) or in the tendency not to localize the self (non-localized responses). Sex differences did arise, however, when the sample was broken down into three major age groups. No sex differences were found in the younger (first and fourth grade) group or in the college sample. Seventh and tenth

grade females, however, tended to localize the self in the head in response to question 1 more often than their male counterparts (8 of 16 localized responses v. 3 out of 15 localized responses; p=069, Fischer's Exact Probability), whereas the males of this group tended to localize the self in the limbs more often than the females (6 of 15 localized responses vs. 1(6%) of 16 localized responses; p=.03, Fischer's Exact Probability). Since this was the single sex difference that was found, all other analyses on question 1 were carried out combining sexes.

No differences between males and females were found in response to questions 2 and 3. The sexes were therefore also combined in the analysis of these questions.

Developmental Trends in the Localization of the Self

This section on age-related trends in response to the questions on the localization of the self is organized primarily around the responses to the first (open-ended) question which are then compared to the responses to the other two questions. The data on the localization of the self is presented similarly to that one the localization of emotion(see Chapter IV) - the responses are reported in terms of major body areas (i.e., non-localized, head, face, body, limbs) with specific body parts (e.g.,

brain, heart) reported only when they were mentioned by five or more subjects.

The responses to the three self questions are presented in Figures V, VI and VII. Age trends within each question were analyzed using chi-square and Fischer's exact probability tests. Within-subject differences in response to the three different self questions were analyzed using Cochran's Q test. These are presented in Table IV. Raw data for each subject on the localization of the self may be found in Appendix D.

Non-localized responses. The number of non-localized responses given to question 1 decreased steadily until the seventh grade and remained low in the later grades. The greatest decrease occurred between the first and fourth grades. Ten (62%) of the 16 first grade subjects gave non-localized responses as compared to 4 (25%) of the fourth grade subjects ($p=.04$, Fischer's exact probability). None of the seventh grade subjects, 1 (6%) of the tenth grade subjects and 2 (12%) of the college subjects gave non-localized responses.

Similar age-related trends were observed in response to the two other self questions (see Table IV, Part A).

Head. The localization of the self in the head comprised 25 (40%) of the 63 localized responses given to

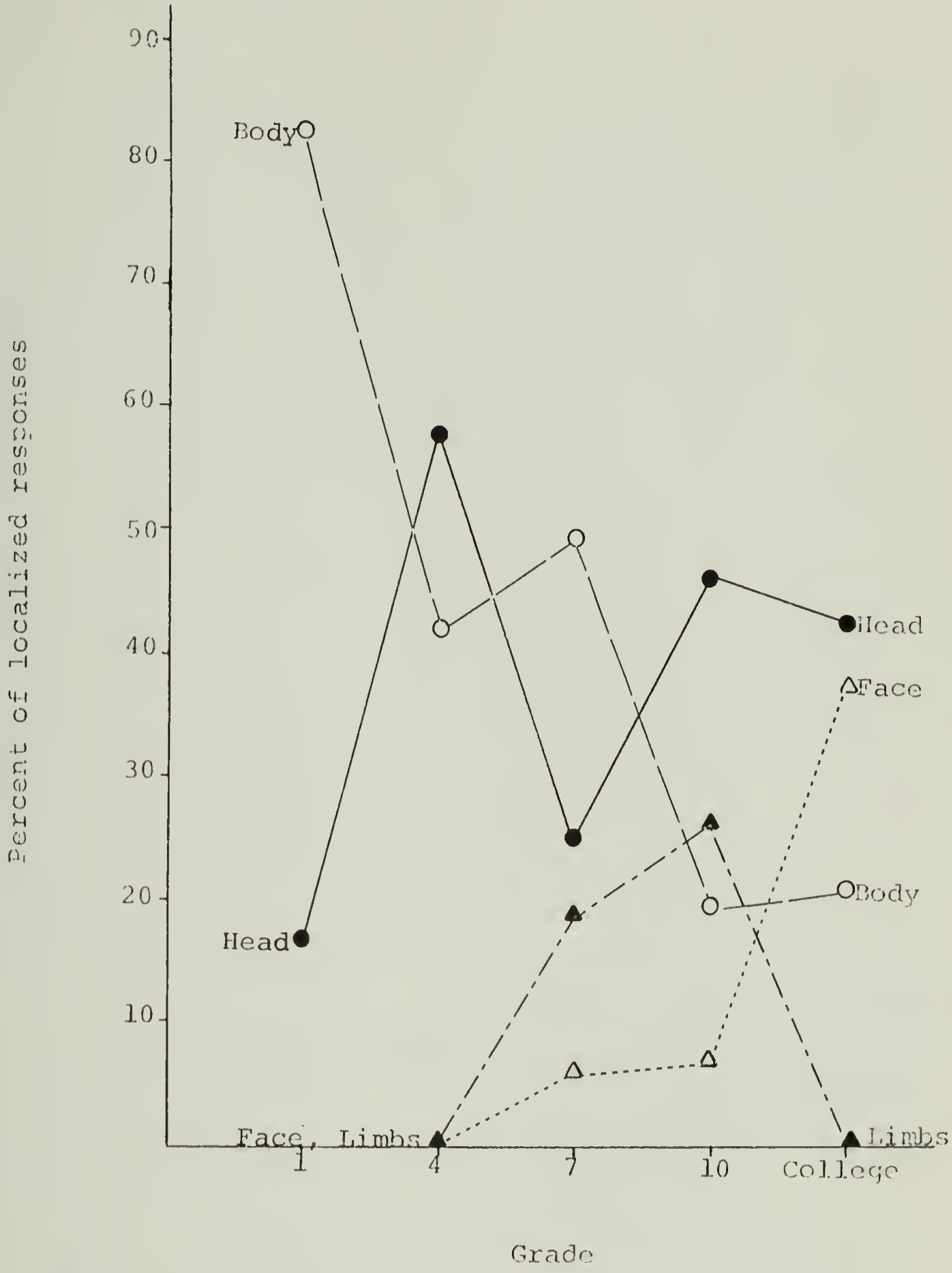

Figure v. Question 1: The localization of the self. Body areas used by localizing subjects.

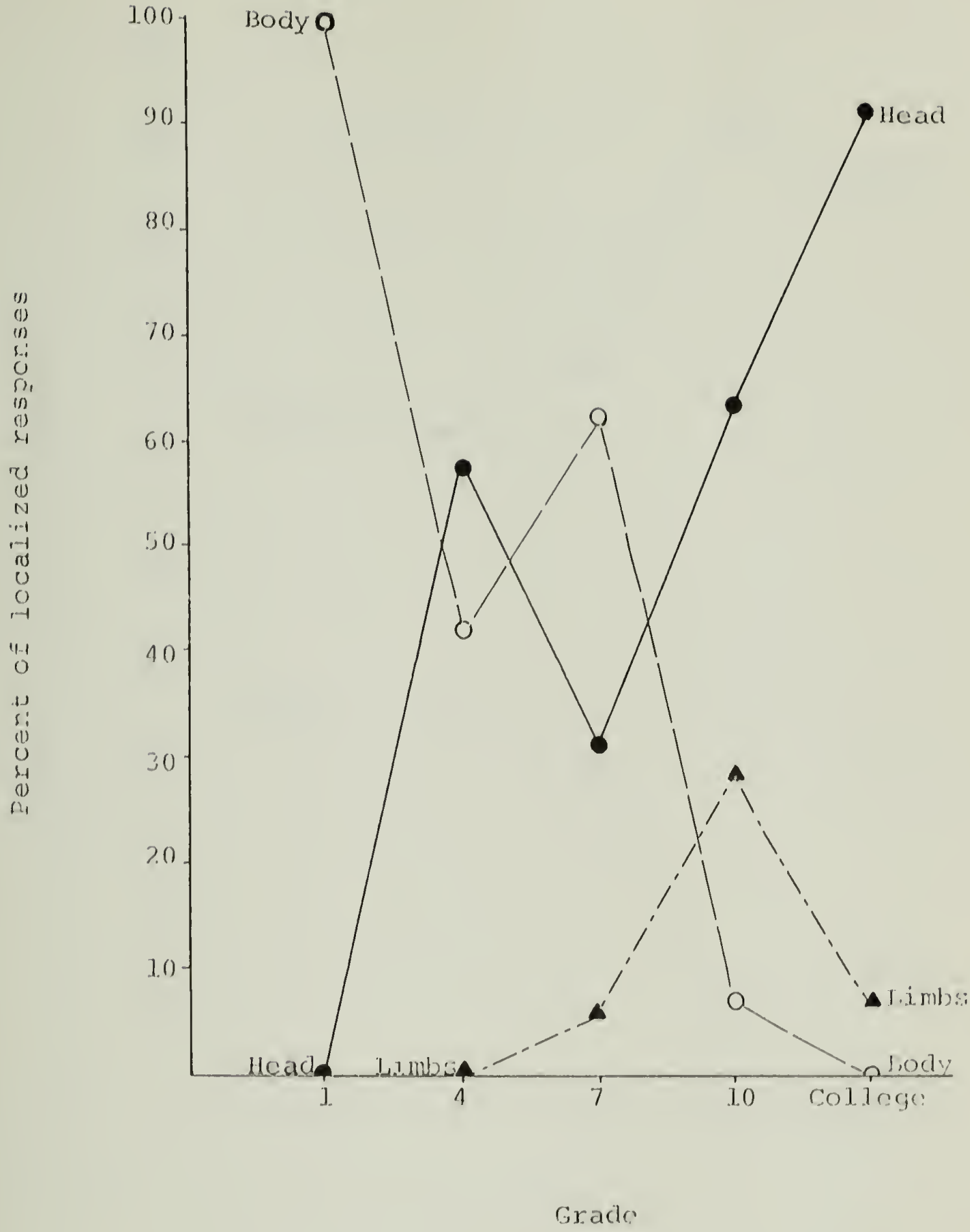

Figure VI. Question 2: The localization of the self. Body areas used by localizing subjects.

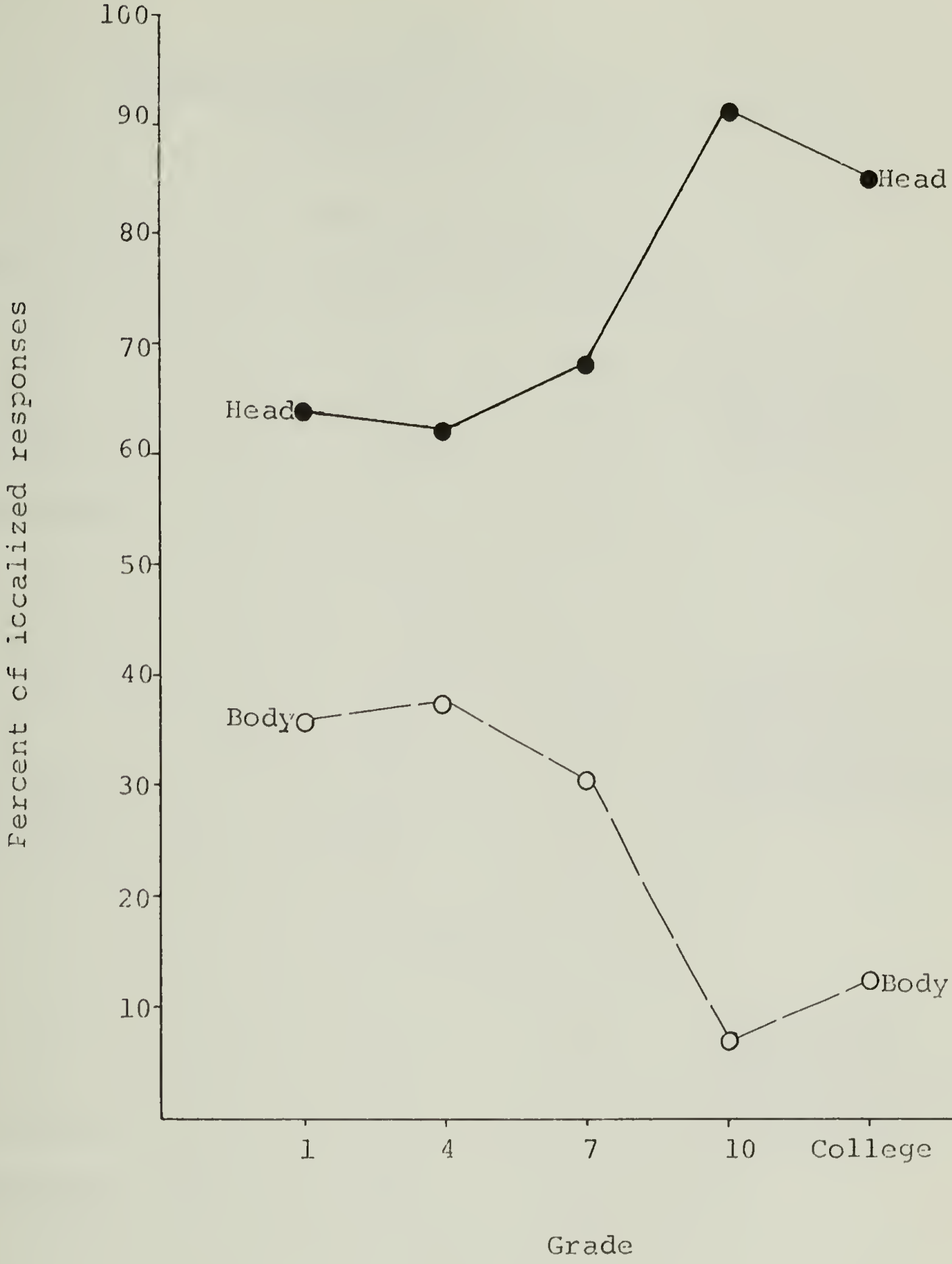

Figure VII. Question 3: The localization of the self. Use of body areas by localizing subjects.

TABLE IV

COMPARISONS BETWEEN QUESTIONS 1, 2 AND 3 ON LOCALIZATION OF SELF

Non-localization

Grade	Question 1	Question 2	Question 3	
1	10	8	5	Q=3.8,n.s.
4	4	4	8	Q=1.3,n.s.
7	0	0	3	Q=6.00,df=2,p<.05
10	1	2	2	Q=1.87,n.s.
College	2	1	1	Q=.667,n.s.
Combined	17	15	19	

Head

1	1	-	7	Q=10.75,df=2,p<.01
4	7	7	5	Q=.28,n.s.
7	4	5	9	Q=5.25,df=2,p<.10
10	7	9	13	Q=7.00,df=2,p<.05
College	6	14	13	Q=9.5,df=2,p<.01
Combined	25	35	47	

Body

1	5	8	4	Q=2.89,n.s.
4	5	5	3	Q=2.00,n.s.
7	8	10	4	Q=8.00,df=2,p<.02
10	3	1	1	Q=1.60,n.s.
College	3	-	2	Q=3.50,n.s.
Combined	24	24	14	

question 1. No significant grade differences were found in the proportion of head responses given to this question, although there was a trend for the localization of the self in the head to increase after the first grade (see Figure 2). Ten (16%) of the head responses were specifically in the brain.

Differences between grades were found in response to the two other self questions. The proportion of head responses increased with age in questions 2 and 3, although this was significant only for question 2. In response to question 2, none of the 8 localizing first grade subjects localized the self in the head. 21 (50%) of the 42 localizing subjects in the middle grades localized in the head and 14 (93%) of the 15 localizing college students localized in the head (χ^2=20.37, df=2, $p < .01$). The number of college subjects localizing the self in the head was significantly greater in response to question 2 than question 1 (see Table IV).

Question 3 tended to ellicit more head responses than the other two self questions. This was significant in all grades except the fourth and college (questions 2 and 3 both elicited more head responses from the college group than question 1; See Table IV). In response to question 3,

7 (64%) of the 11 localizing subjects in the first grade, 27 (77%) of the 35 localizing subjects in the middle grade and 13 (87%) of the 15 localizing subjects in the college sample gave head responses.

Face. Overall, the incidence of localization of the self in the face was low and occurred almost exclusively in the college sample (0 in the first and fourth grades, 2 [6%] of the 31 localized responses in the seventh and tenth grade group and 5 [38%] of the 14 localized responses in the college sample; p=.0009, Fischer's exact probability [college vs. all others]). All 5 of the latter localizations were specifically in the eyes. The seven subjects localizing the self in the face later localized it in the head in response to questions 2 and 3.

Body. The localization of the self in the body decreased with age in response to all three self questions. Five (83%) of the 6 localized responses to question 1 in the first grade were in the body whereas only 3 (21%) of the 14 localized responses in the college sample were in the body (p=.02, Fischer's exact probability; grade 4, 5 [42%] of the 12 localized responses; grade 7, 8 [50%] of 16 localized responses; grade 10, 3 [20%] of 15 localized responses). The specific body areas most often named were the heart (10 responses [16%]) and stomach (6 responses [10%]).

The responses to question 2 showed a similar trend, decreasing from 100% of the 8 localized responses in the first grade to 0 of the 15 localized responses in the college sample ($p = .00002$, Fischer's exact probability; grade 4, 5 (42%) of 12 localized responses; grade 7, 10 (63%) of 16 localized responses; grade 10, 1 (7%) of the 14 localized responses. The responses to question 3 showed a similar decreasing trend which, however, proved to be nonsignificant.

Limbs. The localization of the self in the limbs tended to occur primarily in the middle (seventh and tenth) grades. Seven (23%) of the 31 localized responses in these grades in response to question 1 were in the limbs whereas none of the subjects in the other grades localized the self in the limbs ($\chi^2 = 9.78, df=1, p < .01$). Six of these 7 responses were given by males.

Localization in the limbs in response to question 2 occurred primarily in the tenth grade subjects (4 [29%] of their 14 localized responses vs. 2 responses in all other grades). Those subjects localizing the self in the limbs did so because of special skills associated with them. One tenth grade male, for example, localized his self in the legs because he was a prize-winning runner.

Summary. Developmental trends in the localization of the self can be summarized as follows:

1. With increasing age, more subjects localize the self.

2. Age trends in the localization of the self in different body areas differ with the type of question asked. The localization of the self in the head increases with age in response to questions 2 and 3. The localization of the self in the body decreases with age in response to all three questions.

3. Male subjects in the middle grades tend to localize the self in limbs which are associated with special skills.

The Localization of the Self and the Localization of Emotion

The purpose of this section is to examine the relationship between the localization of emotion (as described in Chapter IV) and the localization of the self. Which, if any, of the emotions tend to be localized in the same part of the body as the self? To examine this question, the number of subjects localizing the self (in response to question 1) and each emotion in the same general body area was compared to the number of subjects who did not similarly localize the self and that particular emotion. These data are presented in Table V. For example, 13 (21%) of the 63 subjects who localized the self also localized anger in the same body area whereas 50 of the 63 subjects

TABLE V

SUBJECTS LOCALIZING EMOTION AND THE SELF IN THE SAME GENERAL BODY AREA

Grade		Anger	Happiness	Love	Sadness	Hunger	Thinking
1	(N=6)	1 (17%)	3 (50%)	4 (67%)	2 (33%)	4 (67%)	1 (17%)
4	(N=12)	0 (0%)	2 (17%)	6 (50%)	3 (25%)	3 (25%)	7 (58%)
7	(N=16)	6 (38%)	7 (44%)	6 (38%)	5 (31%)	8 (50%)	5 (31%)
10	(N=15)	3 (20%)	3 (20%)	2 (13%)	4 (27%)	3 (20%)	8 (53%)
College	(N=14)	3 (21%)	6 (43%)	7 (50%)	4 (29%)	3 (21%)	5 (36%)
Combined	(N=63)	13 (21%)	21 (33%)	25 (40%)	18 (29%)	21 (33%)	26 (41%)

Numbers refer to frequency of similar localization of self and emotion. Percentages refer to percent of total number of localized self responses within each grade.

localized the self and anger in different body areas. The seventeen subjects who did not localize the self were excluded from this analysis.

A similar comparison was made between subjects who localized the self and each emotion in the same specific body part and those that did not. These data are presented in Table VI. For these analyses, all references to the head or brain were treated as a similar localization but references to different body organs such as the heart and stomach were treated as distinct localizations.

As shown in Table V, no significant differences were found among functions in the tendency to similarly localize the self and each function. An examination of Table VI however, reveals that significant differences do emerge when the localization of the self and each function in specific body organs is examined. The self and thinking were most often localized together (40% of the 63 localized self responses), followed by love (33%), happiness (27%), sadness (24%), anger (14%) and hunger (10%; $Q=22.61, df=5, p < .001$). The specific differences found were that subjects more often localized the self and thinking together than the self and hunger ($Q=11.65$, $df=1$, $p < .001$), anger ($Q=10.67, df=1, p < .01$) or

TABLE VI

SUBJECTS LOCALIZING EMOTION AND THE SELF
IN THE SAME SPECIFIC BODY PART

Grade		Anger	Happiness	Love	Sadness	Hunger	Thinking
1	(N=6)	1 (17%)	3 (50%)	4 (67%)	2 (33%)	1 (17%)	1 (17%)
4	(N=12)	0 (0%)	2 (17%)	6 (50%)	3 (25%)	2 (17%)	7 (58%)
7	(N=16)	4 (25%)	3 (19%)	3 (19%)	3 (19%)	1 (6%)	4 (25%)
10	(N=15)	2 (13%)	3 (20%)	2 (13%)	4 (27%)	2 (13%)	8 (53%)
College	(N=14)	2 (14%)	6 (43%)	6 (43%)	3 (21%)	0 (0%)	5 (36%)
Combined	(N=63)	9 (14%)	17 (27%)	21 (33%)	15 (24%)	6 (10%)	25 (40%)

Numbers refer to frequency of similar localization of self and emotion.
Percentages refer to percent of total number of localized self responses
within each grade.

sadness (Q=3.85,df=1, $p < .05$), that subjects more often localized the self and love together than the self and hunger (Q=9.78,df=1, $p < .01$) or anger (Q=5.54,df=1, $p < .02$) and that the self and happiness tended to be more often localized together than the self and hunger (Q=3.56,df=1, $p < .10$).

Overall, it appeared that the positive emotions (love and happiness) and the self were more often localized together than the negative emotions (sadness and anger) and the self. This was tested using a Sign test (Siegel, 1956) and found to be the case (Z=2.01, p=.004, two-tailed).

A further examination of Table VI reveals that the order of coincidence of localization of the self and emotion outlined above (thinking > love > happiness > sadness > anger > hunger) does not appear for each grade when analyzed separately. Examination of these data do not, however, reveal any consistent developmental trends. Unfortunately, the small number of localized responses to the self questions found in the early grades makes meaningful age-group comparisons impossible.

C H A P T E R I X

DISCUSSION

The data obtained in this study provide support for the hypothesis that the localization of the self becomes less diffuse and increasingly centered in the head with age. Older subjects both localized the self more often than younger subjects and tended to localize the self in the head. In addition, it was found that the self was more often localized in the same body area as the positive emotions and thinking than the negative emotions.

The younger subjects in this study, in general, had difficulty in providing a localized response to the first and second self questions and tended to identify the self with the entire body. For example:

Interviewer: If you had to pick a place in your body where Michael is, where would you say that is? Where is your self?
Subject: What do you mean?
Interviewer: If you had to pick a place where your self is, where would you say your self is in your body?
Subject: Um...right on the hip...um...I'm not in myself...What do you mean by that?
Interviewer: Where in your body is yourself?
Subject: Where in my body is myself? All my body is my self.
Interviewer: Is there any place especially?
Subject: No.

(First grade male)

While one explanation for this tendency not to localize the self may lie with the fact that these were difficult questions for young children to understand, this diffuse localization may also reflect the extensiveness of the child's sense of self. While children may, in fact, associate different parts of the body with different qualities or behaviors (as they did in response to the emotion, hunger and thinking questions), they may not yet fully attach differential importance to different attributes or functions. One articulate fourth grader illustrates this by commenting:

> My self...hm...well, it's hard because sometimes it's in my heart, sometimes it's in my brain, sometimes it's in your thighs or all over the place. There's one Carol, then two Carols, then three Carols and it goes up to one hundred and I get smaller and smaller and smaller.

This subject finally settled on the heart because "everybody thinks I'm a really nice person".

It is interesting that while first graders tended either not to localize the self or to localize it in the body in response to the first and second self questions, the third question elicited a large number of head responses. While it is tempting to ascribe this to an incipient symbolic attachment to the head, the virtual absence of head localizations in response to the first two questions

indicates that other factors may be operating. It may be the case that for first graders in particular, the question "who would that (mixed person) be?" is equivalent to "who does that person look like?" and that this may be determined by facial recognition. In other words, it may be that the concrete phrasing of this self question makes it difficult for first graders to conceptualize in terms of an abstract self.

Subjects in the middle grades placed emphasis on the head and body in the localization of the self. The brain was often mentioned and was associated with thinking; the rationale for the body localization was often tied to the emotional significance of the heart ("cause you've got to care for somebody sometimes, you know"). In addition, subjects in the seventh and tenth grades, particularly the males, localized the self in the limbs which were associated with special skills:

> My legs, probably because I use them the most... I take care of them the best...I get famous for my legs, like, you know, I'm always running and, uh, jumping and everything like that, that's what I'm most famous for - my legs. (Seventh grade male)
>
> My hands - I like working with stuff, working with my hands, woodworking and so on. (Tenth grade male)

It appears, then, that between the ages of 9 and 15 the self is variously located throughout the body and that its

localization is tied to intellectual functions, emotional functions and areas of particular personal achievement. In short, it appears that the localization of the self in this group reflects the many factors involved in the adolescent's search for personal identity.

The college students' data were slightly more complex than that of the other groups, particularly in the responses to the first and second localization questions. As in the middle grades, the first question elicited responses in the head and body (although there were fewer of the latter). In addition, a number of college students localized the self in the eyes. Most of these subjects based their localization on the role of the eyes in interpersonal communication.

In contrast to the diversity of localizations to the first question, virtually all of the college students localized the self in the head in response to the second question which demands that the subject choose one part of the body in isolation from the rest. This suggests that the concern with feelings and sensitivity evidenced by the college students is somewhat subordinate to an emphasis on the knowing functions imputed to the head:

> (In response to question 1): Well, when I feel shock and things I guess it would be my stomach because

that's where it really hits me when I feel shock. When I feel happy, butterflies in the stomach kind of thing, Michelle is a stomach but...it's the center kind of thing.
(In response to question 2): With my head, definitely, because that's where all the main kind of sight and hearing and everything goes on....I would say my head. (10 grade female)

(Question 1): I'd say it's like really deep in my chest. Right in the middle, just the center of my balance.
(Question 2): I would be in my head but I wouldn't feel anything except the chest....I'd feel whatever happened in my chest and I'd know whatever happened in my head. (So where would you say you were?) I was in my head. (College male)

(Question 1): The brain, you know, someone's got to be running the show up there, uh, when I'm afraid, which hasn't been recently, I guess I feel myself in the pit of my stomach. You know, maybe because that's the part of you that's mostly moved from the outside. I'd have to say the brain...that's the part of me that know where I am. (College male).

In sum, what appears over the age range sampled is a progression from diffuse localization of the self to a diverse localization based upon interpersonal qualities, intellectual functions and special abilities to a localization of the self based upon the executive and knowing functions of the head.

The second hypothesis was that as children matured there would be an increased discrepancy between the localization of the self and the localization of emotion. Unfortunately, the large number of non-localized responses

to the self question given by the younger children made it impossible to developmentally examine the divergence of the self and emotion. When the relationship between the self and the various emotions was examined it was found that the self was more often associated with the locii of thinking and the positive emotions than with the negative emotions.

This finding is not surprising when one considers the behavioral consequences of the positive and negative emotions and their implications for self attribution (See Averill, 1973 for an extended discussion of this issue). Both anger and sadness are associated with behaviors which are not, as a rule, socially condoned. Anger, for example, may be accompanied by verbal or physical aggression and sadness by inattention to the tasks at hand. The dissociation of the self from these emotions provides a mechanism whereby individuals can avoid taking responsibility for their behavior during these states. The experience of love and happiness, on the other hand, may more often be accompanied by socially tolerated, if not encouraged, behavior. There is evidence, for example, that positive affect increases the frequency of altruistic acts (cf., Moore, Underwood and Rosehan, 1972). In this

case, the attribution of intentionality to the behavior may be self-enhancing.

The case of love is particularly interesting in that it was the only emotion to be associated with both the body (See Chapter IV) and the self. This suggests that while love may be experienced as an emotion which "overcomes" us, the experience of love remains important to the self concept. While there are undoubtedly many reasons for this, one of them may be the cultural importance on love in inducing marriage, the creation of families and, in a larger sense, the continuation of the culture.

Conclusion

Taken as a whole, the above results strongly indicate that an adequate model of the self must emphasize the role of social values in the inception, development and localization of the self. For instance, the fact that the localization of the self in the head is the product of a developmental progression suggests that explanations which rely solely on such factors as "the visual nature of the human universe" (cf., Allport, 1961; Claparade, 1924) or on the primacy of interpersonal experience in infancy (Southwood, 1973) may not be complete. Contrary to the viewpoint expressed by Horowitz (1935), the

localization of the self does not appear to serve merely as "a reference point for the individual as a whole in the situation" but rather symbolizes the "criteria for personhood" within the individual's cultural matrix. It would indeed be interesting to see some further systematic research on the localization of the self, especially as it occurs in other cultures.

C H A P T E R X

CONCLUSION

While the major focus of this thesis has been on the localization of two specific functions, the subjects' reports and quantitative results suggest some of the factors that may be involved in the general development of functional localization. In particular, it appears that the internalization of common linguistic phrases, the salience of personal experience and the acquisition of a degree of physiological knowledge may each influence the localization of function and may be differentially important at various stages in the developmental sequence.

It was previously noted that linguistic expressions which link psychological processes to bodily functions may contribute to the localization of complex functions. While this undoubtedly influenced subjects in all grades, it was found to be particularly pronounced in the younger subjects. For example, most of these subjects localized thinking in the brain and love in the heart despite the fact that they appeared to be unaware of the more precise functions and locations of these organs. It appears that insofar as linguistic idioms provide an introduction to psychological and bodily concepts, they are taken quite literally by younger children to represent the "true" functions of body organs.

The acquisition of more sophisticated knowledge of physiological processes adds another dimension to the localization of function and appears to coexist with, and temper somewhat, the symbolic attributions of functions to body parts. The heart, for example, becomes vital not only for its emotional significance but also because of its crucial physiological role. It may, in fact, be the case that the very recognition of the physiological importance of this organ somewhat frees it of its emotional significance and allows for the development of some of the more subtle symbolic relationships given by the older subjects (for example, the localization of love in the eyes, the "mirror of the soul").

The somewhat anamolous localizations given by subjects in the middle grades suggest that other factors also contribute to functional localization. In particular, it appears that for this age group, personal experience and the awareness of one's own activity become especially prominent during the experience of various psychological states. Relatively abstract symbolic relationships become subordinated to an emphasis on the action of the individual in association with the various states. Thinking, therefore, becomes associated with movement and restlessness and the self becomes associated with parts of the body which determine personal identity through special personal activity.

Overall, it appears that a variety of factors influence the localization of function and that each comes to the forefront at a different stage in the developmental sequence. This suggests that further sampling, especially of older subjects facing different "life tasks", may reveal yet other patterns of functional localization.

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APPENDIX A: CODING SYSTEM

Coding System for Questions 5 and #1 and #2 of Localization of Self

Question 5: When you feel_____, in what part of your body do you feel it most?

Question 1 (self): If you had to pick a place in your body where (child's name) is, where would you say that was? Where is your self?

Question 2 (self): I'd like you to imagine, for a second, that you got taken apart. You'll be put back together again in a few minutes, but for now we'll pretend that different parts of your body are in different places. Suppose your right leg was in one room and your left leg in another. Your left arm was in one corner of this room and your body in the other. Now, where would you say you are?

1. Nowhere
   - 1.1 Dead
2. Everywhere (all over, no place special)
3. Can't say, don't know
4. In soul
5. Head
   - 5.1 Mind
   - 5.2 Inside head
     - 5.21 Brain
   - 5.3 Face
     - 5.31 Mouth
       - 5.311 Teeth
       - 5.312 Tongue
     - 5.32 Eyes
       - 5.321 Right
       - 5.322 Left
     - 5.33 Cheeks
       - 5.331 Right
       - 5.332 Left
     - 5.34 Jaw
     - 5.35 Forehead
     - 5.36 Ears

- 5.4 Top of head
  - 5.41 Top back
  - 5.42 Top front
- 5.5 Temples
  - 5.51 Right
  - 5.52 Left
- 5.6 Back of head

6. Neck
   - 6.1 Throat
   - 6.2 Back of neck
7. Torso, body
   - 7.1 Shoulders
     - 7.11 Right
     - 7.12 Left
   - 7.2 Chest
     - 7.21 Heart
     - 7.22 Lungs
     - 7.23 Esophagus
   - 7.3 Midriff
   - 7.4 Abdomen, stomach
     - 7.41 Navel
     - 7.42 Gut
8. Arms
   - 8.1 Right
   - 8.2 Left
   - 8.3 Hands
     - 8.31 Right
     - 8.32 Left
     - 8.33 Fingers
       - 8.331 Right
       - 8.332 Left
     - 8.34 Fists
       - 8.341 Right
       - 8.342 Left
     - 8.35 Palms
       - 8.351 Right
       - 8.352 Left
   - 8.4 Forearms
     - 8.41 Right
     - 8.42 Left
   - 8.5 Upper Arms
     - 8.51 Right
     - 8.52 Left
     - 8.53 Biceps
       - 8.531 Right
       - 8.532 Left

9. Legs
   - 9.1 Right
   - 9.2 Left
   - 9.3 Thighs
     - 9.31 Right
     - 9.32 Left
   - 9.4 Calves
     - 9.41 Right
     - 9.42 Left
   - 9.5 Knees
     - 9.51 Right
     - 9.52 Left
   - 9.6 Ankles
     - 9.61 Right
     - 9.62 Left
   - 9.7 Feet
     - 9.71 Right
     - 9.72 Left
     - 9.73 Soles
       - 9.731 Right
       - 9.732 Left
     - 9.74 Toes
       - 9.741 Right
       - 9.742 Left

Coding System for Question 3 (Self)

Question 3a(self): Suppose I sent you to Mars with John Jones. When you came back, I noticed that the person who walked out of the spaceship had John's head and your body. Who would that person be?

Question 3b(self): How about if it had your head and John's body? Who would that be?

1. No answer, can't say
2. Both of us
   - 2.1 Contraction or hyphenated
     - 2.11 Other first, then me
     - 2.12 Me first, then other
3. Neither of us
   - 3.1 Somebody else
   - 3.2 Nobody
   - 3.3 Other person or response
4. Me
   - 4.1 More me than other
5. Other
   - 5.1 More other than me

APPENDIX B: RAW DATA ON THE LOCALIZATION OF EMOTION, HUNGER AND THINKING*

GRADE I

MALES

SUBJECT#	ANGER	HAPPINESS	LOVE	SADNESS	HUNGER	THINKING
1101	3	5.31	3	3	7.4	5.21
1102	8.34	7.21	7.21	5	5.31	5.21
1103	3	3	3	3	7.4	5.21
1104	5.21	2	7.21	5.32	7.4	5.21
1105	9.7	8.4	7.4	9.1	7.4	2
1106	5.21	7.21	7.21	7.21	7.4	5.21
1107	5	5.3	5	5	5*,7.4	5
1108	5.21	5.21	7.4	7.21	5.21,7.4*	5.21

FEMALES

2125	5.21	5.3	2	5.32	7.4	5.21
2126	5	5	7.4	5	7.4	5
2127	3	3	7.2	3	7.4	5.42
2128	7.4	5.331	7.21	5.321	7.4	5.21
2129	3*	2	3	3	7.4	5
2130	5,8*	5	7.21	5.3	6.1	5.21
2131	2	7.21	7.21	7.21	7.4	5.21
2132	2	7.4	1	7.4	7.4	5.52

* Numbers refer to body parts listed in Appendix A. In the case of multiple localizations, * indicates primary localization.

GRADE 4

MALES

SUBJECT#	ANGER	HAPPINESS	LOVE	SADNESS	HUNGER	THINKING
1209	8.3	5	7.21	5	5.31	5.21
1210	8.34	5.3	2	9	7.4	5
1211	5	5	2	5	7.4	5.1
1212	2	2	2	2	7.4	5.21
1213	5	2	7.21	7.21	7.4	5.21
1214	5.1,5.21,* 5.35	5.2,5.3*	5.35	5.35	5.31,7.4*	5.21
1215	8	5.31	7.4	2	7.4	5.21,5.4*
1216	2	5	5	7.4	5.31	5.42

FEMALES

2233	6.1	2	5.21	6.1	7.4	5.21
2234	5.21	7.21	7.21	2	7.4	5.21
2235	3	2	5.32	2	7.4	5.21
2236	2	5.3	7.21	7.21	5.31,5.33* 7.4	5.21* 5.32
2237	7.4	5.3,7.4*	3	5.21	7.4	5.21
2238	5.3	5.3	5	5.21	7.4	5.21
2239	2 *	9	2	3	7.41	5
2240	5.21,9.7	7.21	5.21,7.21*	7.21	7.4	5.21

GRADE 7

MALES

SUBJECT#	ANGER	HAPPINESS	LOVE	SADNESS	HUNGER	THINKING
1317	5	5	5	5.1,5.21	7.4,9	5
1318	5.21	7.3	7.3	5.21	7.4	5.21
1319	7.4	7.4	7.4	9.5	7.4	5,5.21
1320	5.311,8	7.4	5.31	5.1,5.35 7.4	5,7.4	5,5.21 5.32
1321	5.1	2	5.1	5.1	7.4	5.1
1322	7.21	2	7.21	6.1,5.32 7.21,	7.4	5
1323	8	5.31	7.21	5.21	7.4	5.35
1324	8	7.4	7.4	5.32,6, 9.5	6.1 7.3	8.3

FEMALES

2341	3	2	3	5	7.4	5
2342	8	7.21	7.4	5.32,6.1	7.4	5
2343	5.1	5.1	7.21	7.21,7.4	7.4	5.1
2344	8	7.4	7.21	7.21	7.4	5.21
2345	8.3	5.3	5.21	5,7.4	7.4	5.1,5.21 5.52
2346	5	5.3	7.21	7.21	7.4	5
2347	5.3,7.1	5.3	5	9	7.4	5.41
2348	5	7.21	7.21	7.21	7.4	5.42

GRADE 10

MALES

SUBJECT#	ANGER	HAPPINESS	LOVE	SADNESS	HUNGER	THINKING
1449	5,5.31*	5	2	2	5*,7.4	8.31
1450	7.21	2	7.3	7.4	7.4*	5.42
1451	3	2	5	6.1*,5	5.31,7.4*	8
1452	8.3	5	5	5	7.1,7.4*	5.41
1453	5.6*,6, 7.1	5	7.21	7.21	7.4	5
1454	5.31	7.21	7.21	7.21	5,7.4*	5.21
1455	5	5	5.21	5	7.4	2
1456	6.1, 7.4*	5.33	5.321	5.34, 6.1*,7.23, 7.4	5.61*,7.4	5.31, 5.32, 9.7*

FEMALES

2465	7.3	2	7.21	*5,7.21	7.4	5.1
2466	7.4	2	5	2*	7.4	5
2467	5.311	2	5.3*,8	8.33, 8.34	5.31,7.4*	8.3, 9.7*
2468	9.4	5.31*, 5.32	5.32	9.5	7.4	5.21, 5.5*
2469	5.311, 8.341*	6.1, 7.21, 7.4*	7.4	9.7	7.4	9.7
2470	7.21	7.4	7.21	5.5	7.4	5.2
2471	5.33	7.4	5.32	5.31, 5.33*	7.4	8.3
2472	7.4*,8	5.31	5.1	2	7.4	5.35

COLLEGE

MALES

SUBJECT#	ANGER	HAPPINESS	LOVE	SADNESS	HUNGER	THINKING
1557	5.41 7.4*	5.5	7.2 7.4*	7.3,7*.4	6.1,7*.4	5
1558	7.4	7	2	3	7.4	5
1559	8.3	5.34	5.4	2	7.4	*5,7.21
1560	8.531	2	5.31* 7.2	5.21 5.5*	7.4	5.41
1561	6.2,7.1 7.21*	5.42,7.21* 7.4	5, 7.2, 7.21*	5.6,6, 7.21*	5*.31, 7.4	5.42
1562	7.2	5,6*,7.1 7.2,7.3	5.32 7.1 9*	5.35	7.42	7.1
1563	5.35	2	2	5	6.1,7*.4	5.35
1564	7.2	5.32,5.33 5.34*	5*.32 5.42	7.42	7.4	9

FEMALES

2573	5.4	5*.3,5.6	7.21	5.1,6 , 7.2*	*5,5.34	5.21
2574	5.32	5*.21,5*.35	5.32	8	5.35	5.41
2575	8.341	5*.32,5.36	5.31	7.1,8, 9	7.4	5.35
2576	7.21	7.21	7.21	7.21	7.4	5.35
2577	2	5	2	5	7.4	5.21
2578	7	5*.31,5.32	5,6*.2 7.2	5.5	7.4	5.42
2579	5.3, 8.31*	5.1	5.1	2	7.4	5.41
2580	5.32, 9.2*	5.31	5.32	5,5*.32 8,9, 9.7	7.4	5.35

APPENDIX C:SEX DIFFERENCES IN THE LOCALIZATION OF THE SELF:FREQUENCY OF RESPONSE

QUESTION 1

NON-LOCALIZED

	MALES	FEMALES
Grade 1	4	6
4	2	2
7	-	-
10	1	-
College	1	1
Combined	8	9

HEAD

	MALES	FEMALES
Grade 1	1	-
4	3	4
7	-	4
10	3	4
College	3	2
Combined	10	14

FACE

MALES	FEMALES
-	-
-	-
-	1
1	-
2	4
3	5

BODY

	MALES	FEMALES
Grade 1	3	2
4	3	2
7	5	3
10	-	3
College	2	1
Combined	13	11

LIMBS

MALES	FEMALES
-	-
-	-
3	-
3	1
-	-
6	1

QUESTION 2

NON-LOCALIZED

	MALES	FEMALES
Grade 1	5	3
4	3	1
7	-	-
10	1	1
College	1	-
Combined	10	5

HEAD

MALES	FEMALES
-	-
2	5
1	4
5	4
7	7
15	20

BODY

	MALES	FEMALES
Grade 1	3	5
4	3	2
7	6	4
10	-	1
College	-	-
Combined	12	12

LIMBS

MALES	FEMALES
-	-
-	-
1	-
2	2
-	1
3	3

QUESTION 3

NON-LOCALIZED

	MALES	FEMALES
Grade 1	3	2
4	4	4
7	2	1
10	1	1
College	1	-
Combined	11	8

HEAD

Grade 1	2	5
4	2	3
7	5	4
10	6	7
College	6	7
Combined	21	26

BODY

Grade 1	3	1
4	2	1
7	1	3
10	1	-
College	1	1
Combined	8	6

APPENDIX D:RAW DATA ON THE LOCALIZATION OF THE SELF*

GRADE 1

MALES

SUBJECT#	Q.1	Q.2	Q.3a	Q.3b
1101	1	1	2	2
1102	2	2	2	2
1103	2	2	5	4
1104	2	2	4	5
1105	7.4	7	5	4
1106	5.21 7*.21	7	4	5
1107	7.4	7	2.11	2.12
1108	5.21	2	4	5

FEMALES

2125	2	7	5	4
2126	3	7	5	4
2127	2	2	5	4
2128	2	2	5	4
2129	2	2	2	2
2130	7.2	7	4	5
2131	7.21	7	2.11	2.12
2132	2	7	5	4

*Numbers refer to body parts listed in Appendix A. In the case of multiple localizations, *indicates primary localization.

GRADE 4

MALES

SUBJECT#	Q.1	Q.2	Q.3a	Q.3b
1209	5	2	2	2
1210	7.2 7*.4	7	4.1	5
1211	2	2	2	2
1212	5.21	5	5	4
1213	2	2	2	2
1214	4 7*.2	7	4.1	5
1215	7.4	7	2	2
1216	5.21	5	5	4

FEMALES

2233	5.21	5	5	4
2234	2	5	5	4
2235	7.2	7	2	2
2236	7.21	7	5	4
2237	2	5	2	2
2238	5	5	2	2
2239	5.1	2	2	4
2240	5	5	4	5

GRADE 7

MALES

SUBJECT#	Q.1	Q.2	Q.3a	Q.3b
1317	9.3	9.1	5	5
1318	7.4	7	2	2
1319	7.21	7	2	2
1320	7.21	7	5	4
1321	9.7	5	5	4
1322	7.21	7	5	4
1323	7.21	7	5	4
1324	9.3	7	4	5

FEMALES

2341	5	5	5	4
2342	7.21	7	4	5
2343	5.1	5	3.1	3.1
2344	7.21	7	4	5
2345	7.21	7	4	5
2346	5	5	5	4
2347	5.3	5	5	4
2348	5.21	7	5	4

GRADE 10

MALES

SUBJECT#	Q.1	Q.2	Q.3a	Q.3b
1449	8.3	8.31	3	3
1450	5.1	5	5	4
1451	2	5	5	4
1452	5.21	2	5	4
1453	5.1* 5.21 5.6	5	5	4
1454	8.3	8.1	4	5
1455	5.312	5	5	4
1456	9.71	5	5	5

FEMALES

2465	5.21	5	5	4
2466	7.4	2	2	3.1
2467	5.1* 5.2	5	5	4
2468	6	8.1	5	4
2469	8.3 9*	8	5	4
2470	5.2	5	5	4
2471	7.42	5	5	4
2472	5.21* 5.42	7	5	4

COLLEGE

MALES

SUBJECT#	Q.1	Q.2	Q.3a	Q.3b
1557	7.2	5	5	5
1558	5.32	5	5	4
1559	5.21	5	5	4
1560	7.2	5	4	4
1561	5.4	1	2	4
1562	2*	5	5	4
1563	5.2 5.41	5	5	4
1564	5.35	5	5	4

FEMALES

2573	2	5	4	5
2574	5.21	8.2	5	4
2575	5.32	5	5	4
2576	7.21	5	5	4
2577	5.32	5	5	4
2578	5.32	5	5	4
2579	5.1* 5.41	5	5	4
2580	5.32	5	5	4